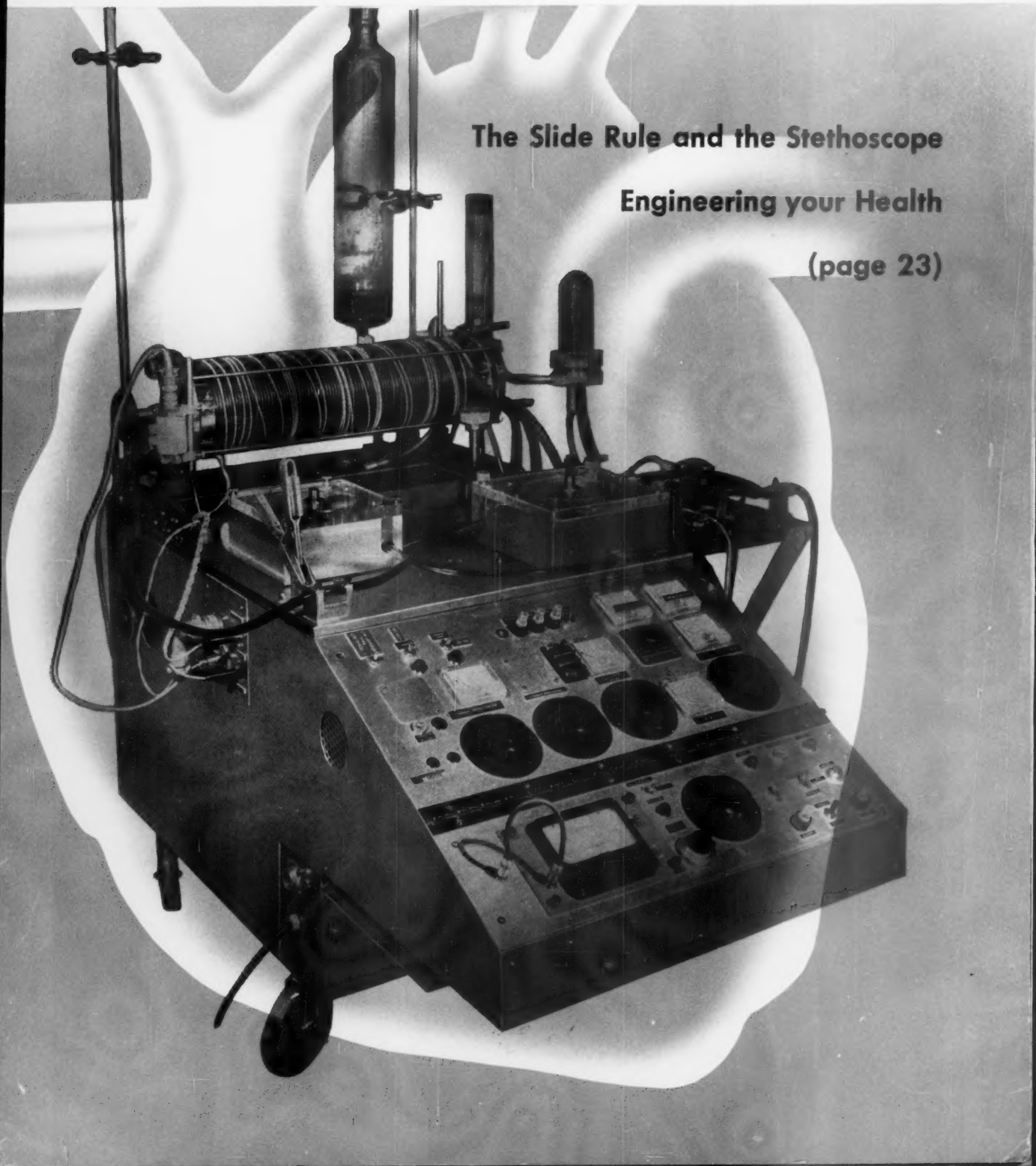
The Magazine of the Registered Professional Engineer

American Engineer

NOVEMBER 1961

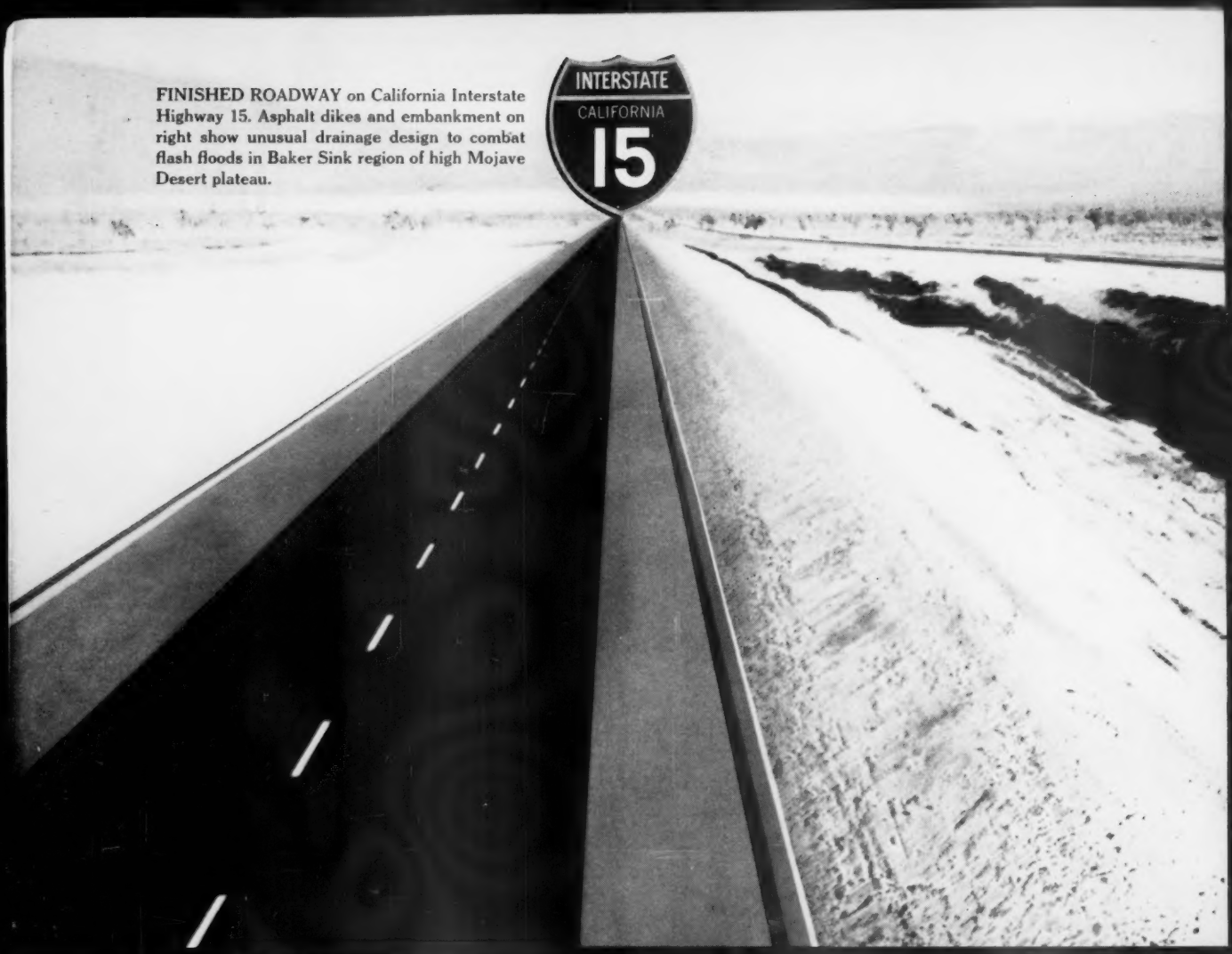


The Slide Rule and the Stethoscope

Engineering your Health

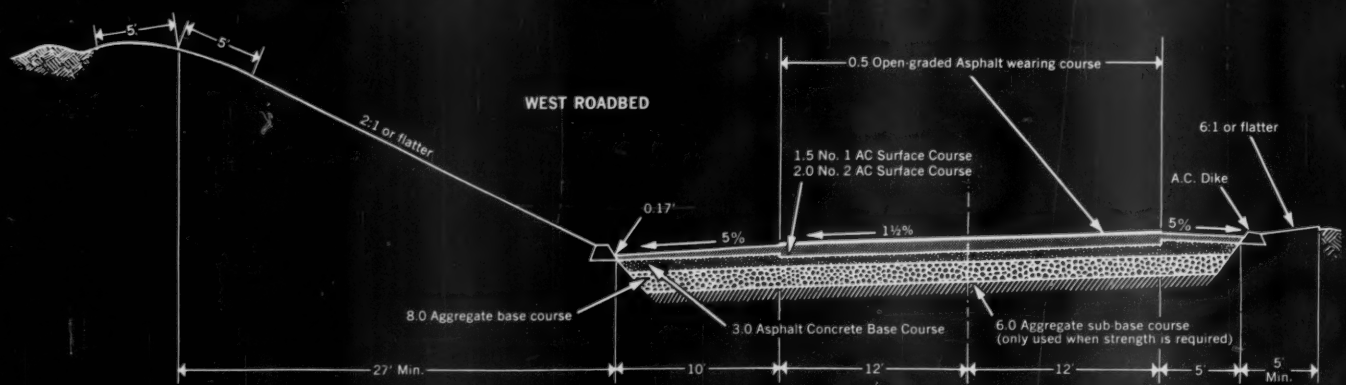
(page 23)

FINISHED ROADWAY on California Interstate Highway 15. Asphalt dikes and embankment on right show unusual drainage design to combat flash floods in Baker Sink region of high Mojave Desert plateau.



ASPHALT DIKES on shoulder edges direct surface water to drainage outlets.

STONE CRUSHERS make use of local aggregate found at site to offer California taxpayers important savings.



CALIFORNIA HIGHWAY ENGINEERS SPECIFY DEEP STRENGTH ASPHALT CONSTRUCTION

Asphalt dikes and ditches to divert Mojave Desert flash flood water from Interstate Highway 15.

California's largest asphalt pavement highway contract used local aggregate crushed on site resulting in substantial economies.

For the 25.2-mile four-lane, divided limited access section of California Interstate Highway 15 that replaces U.S. Route 91 from 1 mile east of Baker, California, to 1 mile east of the Cima Road, engineers of the California Division of Highways chose the Advanced Design Criteria for modern DEEP STRENGTH Asphalt Construction.

Natural Obstacles . . . Location in southeastern California on the high eastern Mojave Desert plateau, with elevations from 1,000 to 4,000 feet, posed some unusual design problems. Temperatures range from 115° in summer to 25° in winter, rainfall averages only 4¾ inches annually (which usually occurs as hard downpours).

Flash floods occur because rainwater reacts with minerals in the dry sand to form an impervious crust. The resulting rapid surface run-off must be controlled to prevent undermining of the roadway. California Division of Highways through many years of study has developed an effective solution to these unique drainage problems by use of diversion ditches and dikes.

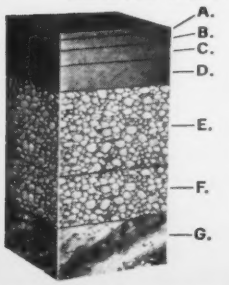
DEEP STRENGTH Design . . . The cross section below shows how California engineers made use of the principles of DEEP STRENGTH Asphalt Construction. Note 4" surface and wearing courses with 3" asphalt-concrete base course. The 8" aggregate base and 6" subbase (where necessary) consist of *water-bound* layers of 1½" max. stone compacted with pneumatic rollers and steel tandem rollers. The 8" aggregate base is primed with 0.25 gal. per sq. yard of SC-2 before asphalt-concrete base course was spread. Total thickness is 15 inches to 21 inches depending on the subsoil.

A median 90 ft. wide was used, with no treatment. (The crust and scant vegetation on median surface was kept intact to minimize erosion during periods of high surface run-off and/or wind.) Outside shoulders are 10 ft. wide and paved. Inside shoulders have 2 ft. paved and 3 ft. unpaved. (In cut sections, 5 ft. wide, all paved.)

Taxpayer Saving . . . DEEP STRENGTH Asphalt Construction allowed California's engineers to use local aggregate crushed at the site. This, plus the inherent economy of Asphalt Construction, results in important savings for the taxpayer of California. And low future maintenance costs on DEEP STRENGTH Asphalt will provide additional tax savings.

THE ASPHALT INSTITUTE College Park, Maryland

THIS IS DEEP STRENGTH DESIGN ON CALIFORNIA INTERSTATE 15



A. Wearing Course	0.5
B. No. 2 AC Surface Course	1.5
C. No. 1 AC Surface Course	2.0
D. Asphalt Concrete Base Course	3.0
E. Aggregate Base Course	8.0
F. Aggregate Subbase	6.0
G. Subgrade or Improved Subgrade	—
TOTAL MAXIMUM THICKNESS	21.0

Letters to the Editor

Article 'Nonsensical' . . .

Dear Editor:

Your article "The Engineer—a Member of Management?" (August, 1961) is certainly one of the most nonsensical things to be printed on a subject full of nonsense.

The only consolation is that very, very few drawing-board engineers will agree with Mr. Kemper and his strange definitions.

PETER KIMM, P. E.,
Beechhurst, N. Y.

No Government Group . . .

Dear Editor:

Reference is made to the article, "Professional Government Employee Group Planned", in the AMERICAN ENGINEER, August, 1961.

As a government and professional engineer I think it would be a great mistake to organize such a group. What we need is a stronger Engineer-in-Government Committee in NSPE. One professional society is enough. In order to promote better engineering and science we should be spending our time in technical societies.

MORRIS J. TURNER, P. E.,
Walla Walla, Wash.

Recruiting Defended . . .

Dear Editor:

I read with interest your article entitled, "What's Wrong With College Recruiting", in the June, 1961, edition of the AMERICAN ENGINEER.

I have had the opportunity to look at the college recruiting problem from both sides of the fence since I was in placement at Pennsylvania State Univeristy and am presently responsible for the College Relations Department at the Radio Corporation of America.

It is somewhat unfortunate that you failed to mention the progress that has been made in the last ten years in the field of college recruiting, but did manage to list all of the shortcomings. It seems that everyone likes to write about the negative side of the problem and fails to mention in the proper perspective, the advancements that have been made. It is true that there is a long road to come before the student, the college, and the company have reached the point where everyone is happy and the right man is in the right job.

It seems to me that you would have contacted other people who have had long experience in the field before writing an article that will be read by members of the engineering profession. Some companies have been involved in college recruiting over 50 years, but I did not see you mention any one of these organizations. A number of men have personally been involved in the development of the college relations field for over 15 years, and these men also were neglected in your presentation. It is always easy to mention the exceptional cases when illustrating a point that you want to make (such as the 22-year-old engineer who dictates a $13,500 salary) but it is sometimes more interesting to talk about the problems facing the majority of students and not just the individuals in the minority.

An article might be needed to show what progress has been made by companies which have made real contributions to the field. I hope that the AMERICAN ENGINEER will continue to present topics like this to keep our professional people advised of the young engineer and the work that is being done to get him into the right job where he can be productive and assume his role as a professional engineer.

DONALD M. COOK, Manager,
College Relations,
RCA Staff,
Camden, N. J.

Not Too Pleased . . .

Dear Editor:

In your letters column for August, 1961, Don R. King, P.E. made a very penetrating plea for "any kind of recognition." I have searched the St. Louis directory and found no listing under "Professional Engineers." Indeed, in the large number of engineers listed under various engineering specialties, *not one* even bothered to add any reference to registration as a professional engineer.

I know what the Society is struggling to accomplish and I am wholeheartedly on your side. There are, though, a few things in AE that stick in my craw.

(1) "Your classified advertisement here will reach more than 60,000 readers." Perhaps it will, but do other engineers buy my services? I think not. The public does, but the public doesn't read AE.

(2) You propose to open membership in the Society to nonregistered engineers, but you make the qualifications required such that, if eligible, they could join the Society anyway.

(3) At this time industry in the St. Louis area doesn't give a hoot whether its engineers are registered or not. I am employed by the largest single employer in the State of Missouri, yet in over 3000 personnel in engineering divisions in our company I'm told that there are some 60 P.E.'s. Situations such as this one, I believe, are the reason why the

(Continued on page 56)

CORRECTION

The title "Past NSPE Vice President" which AE added to a letter by S. Eugene Easley in the October issue (page 6) belongs instead to L. Eugene Easley, who was vice president from the Central Area in 1959-60.

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American Engineer

NOVEMBER 1961
Vol. 31, No. 11

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

BPA
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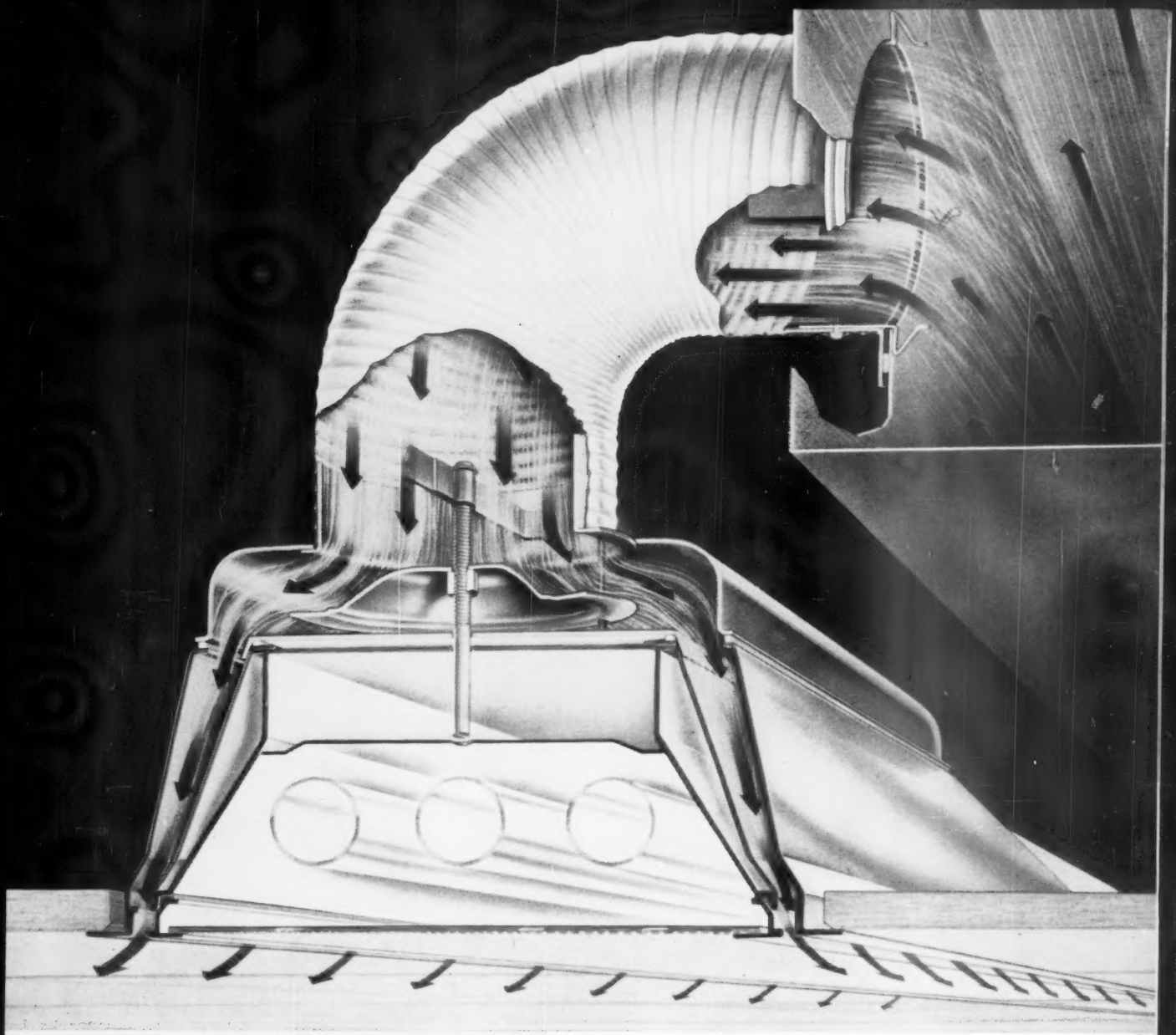

▲ Here is a cutaway view of the new Benjamin Triple-Shell Lumi-Flo troffer. See how the damper diffuses the air and directs it evenly to air manifolds on both sides of the troffer. Note also how the lamp chamber is separated from the air passageway at top and sides by an insulating air gap. This lets lamps operate at near their optimum design temperature—unaffected by the cooling or heating air flow.

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(Circle 3 in Readers' Service Dept.)

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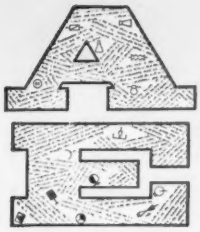

"This Month"

Since the days of Roentgen (the X-ray) at least, technical men have been close and valued allies of their professional brothers, the medics. This dependence of medicine on engineering increases as both fields become more complex and it is at this new reliance that our lead article "This Month"—The Slide Rule and the Stethoscope"—directs itself. Page 23.

Who's doing what in engineering? The profession is worried about the increasing problem of keeping engineers informed on the welter of new developments. Here are some of the things industry and government are doing about it. Page 30.

Would you believe that what you read largely determines how well you write? It's a fact, so says the author of our article on page 36.

And the miscellaneous bill of fare "This Month" is better than ever: 1. A BER case on the use of the PE Seal . . . 2. A most interesting case history of a union fight . . . 3. The first in a series dealing with proposed changes in NSPE membership requirements. Pages 34, 35, and 40.

Reviewing the news pages:

General. Page 10. U. of Rochester leads in bio-engineering studies . . . Electronic device may revolutionize recruiting . . . Using P.E. seal puts draftsman on probation.

Industry. Page 14. Voting procedure altered for Reynolds by NLRB . . . Technicians listed among critical occupations . . . Bill would allow cost of education deducted . . . Congress softens stand on recruiting ad costs.

Consulting. Page 16. Administration backs $100 per diem for consultants . . . GAO criticizes Maine for means of letting contracts . . . Kansas official opines on supervision case.

Government. Page 18. Society backs President's bill for water resources . . . NSPE praises CSC's new engineer qualifications . . . Robbins testifies before Kennedy Task Force.

Keep up to date! Read the full report on the fall Board of Director's meeting—page 45.

Kenneth E. Trombley

Editor

U. of Rochester Leads in Bio-Engineering Studies

A new seminar course in biomedical engineering, the first of its kind in the United States, was initiated this semester at the University of Rochester College of Engineering and will continue until next May.

The biomedical program of research and graduate training was recently established at the University of Rochester under a five-year National Institutes of Health grant totaling $254,407.

The course will be conducted by Dr. Daniel W. Healy, chairman of the Department of Electrical Engineering, and by Dr. Lee B. Lusted, professor of biomedical engineering and associate professor of radiology at the University Medical Center. Invited lecturers of national stature will also take part, including some from Johns Hopkins University and the University of Pennsylvania, both of which also have received NIH grants for biomedical engineering as part of a regional project in cooperation with the University of Rochester.

The program of graduate studies will lead to the Ph. D. degree in engineering with special application to the fields of medicine and the life sciences. Students will be trained for careers in industrial research, for work in research centers, and for university teaching and research.

Dr. John W. Graham Jr., dean of the College of Engineering, points out that the program was developed because of the "growing usefulness of modern engineering techniques in biological and medical research and the resulting need to have some engineers who not only are educated in classical branches of engineering but also are trained in the specialized biological and medical applications of engineering." This new field, he said, will achieve the same status as communications, network control, or systems engineering.

See page 21 of this issue for a report on the combining of engineering with medicine.

In addition to the University of Rochester graduate students, the new seminar course is open to others in industry. Two-thirds of the course will be devoted to engineering, and one-third to the biological or medical sciences.

Subjects to be covered in the first semester will include passive electrical properties of biological systems, behavior of biological systems in intense electromagnetic fields, neurophysiology of the brain, information theory in biology and medicine, computer techniques in analytical studies of neuroelectric activity, computational principles in living organisms, characteristics of versatile computers for biological investigation, and the cardiovascular system.

Electronic Device May Revolutionize Recruiting

The recent opening in New York City of a "Career Center" may have introduced a system that will completely renovate recruiting of engineering and scientific personnel.

Engineers and scientists registering at the New York "Career Center" will have their qualifications flashed by the closed-circuit teletype to participating employers. Within minutes, the registrant learns which employers are interested in his particular qualifications. He then makes appointments to interview his choices among those that desire to see him. Applicants remain anonymous until they are actually face-to-face with the company representative. There is no "employment fee" to either applicant or employer.

The "Career Center" is operated by Careers Incorporated of New York City. William A. Douglass, president of Careers, describes the Center's purpose as "An effort to remove recruiting from the back rooms and clandestine hospitality suites which have plagued technical meetings and conventions. We believe that men in the engineering profession deserve an opportunity to seek jobs and obtain information in a dignified and professional manner."

This New York Center marks the inauguration of a nation-wide teletype network, transmitting registrations on a nightly basis from this Center to the home offices of employers unable to send representatives to interview at the Center. This integrated system could eventually tie all of the Nation's scarce and vitally needed manpower together in a single and easily accessible pool.

Using P.E. Seal Puts Draftsman on Probation

A magistrate's court in Clayton, Missouri, recently fined a draftsman for violation of a Missouri statute which forbids the improper affixing of the seal of a professional engineer. Besides the fine, he was placed on probation for a period of two years.

To a couple who were planning to erect a four-family apartment house, the draftsman had sold a set of plans with an engineer's seal. The engineer whose seal appeared on the plans denied that he had attached his own seal to the plans.

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(Circle 4 in Readers' Service Dept.)

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(Circle 6 in Readers' Service Dept.)

Voting Procedure Altered for Reynolds by NLRB

Professional employees could unexpectedly find themselves facing a vote on collective bargaining representation, even though the union had made no claim to represent them, if the NLRB adheres to a recent decision.

In an unusual case at the Reynolds Electrical and Engineering Company, a Teamster local sought to represent 15 first aid attendants. The company contended, however, that the appropriate collective bargaining unit should include a group of professional nurses and pharmacists. Even though the union had shown no interest in representing the professionals, a normal NLRB requirement, the Board decided in agreement with the company that the larger unit was appropriate.

In compliance with the Taft-Hartley Act, the NLRB will hold a separate vote on whether the professionals wish to be included in a mixed unit with the nonprofessional first aid attendants. Normally, they would have the alternative of being represented by the union in a separate unit. In a further departure from previous Board policy, the professionals' second vote (for or against the Teamsters) will only be counted if the professionals choose the mixed unit on the first vote.

Thus, if the professionals vote against inclusion in the mixed unit, they will remain unrepresented, regardless of the outcome in the unit of first aid attendants.

Technicians Listed Among Critical Occupations

The Labor Department has announced that six new occupations have been added to the critical skills list used in screening personnel for assignment to the Standby Reserve. Among the six new occupations listed are engineering and physical science technicians. Other new occupations listed are federal security specialist, astronomer, health-physicist, production planner, and tool planner.

In announcing the changes, the Department explains that the list serves as a guide for transferring personnel with critical civilian skills from the Ready Reserve to the Standby Reserve. Under present law, personnel in the Ready Reserve may be called to active duty at the option of the President and the Defense Department, but those in the Standby Reserve cannot be called without further Congressional action.

Bill Would Allow Cost of Education Deducted

Representative Curtis of Missouri introduced a bill in the recent session of Congress to make the costs of education or training deductible as a trade or business expense when they are incurred to get a new or better job. Under present Internal Revenue and court rulings, education costs may only be deducted when they are necessary to maintain existing skills, status, salary or employment.

Under present law, an engineer may deduct costs of education necessary to maintain his status in his present field of employment, but not to enter a new field, such as law. Under the Curtis bill, he could deduct expenses for study in any field.

Congress Softens Stand on Recruiting Ad Costs

Final Congressional action on the Defense Appropriations Bill eliminated a provision which would have prevented defense contractors from using Federal money to pay the cost of engineer recruiting advertising.

In an effort to eliminate $30 to $35 million in advertising costs from Government payments to defense contractors, the House Appropriations Committee had added a provision to the bill to rule out all advertising by contractors.

The Senate Appropriations Committee, however, expressed concern that such a limitation would prevent defense contractors from advertising for highly specialized and qualified engineers and scientists, and inserted language to exempt such costs from the provision. In conference, the House decided to go along with the Senate on this exception, although other defense contract advertising was sharply restricted.

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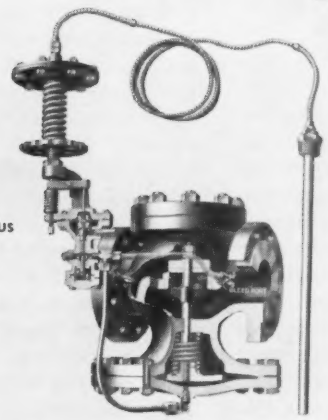
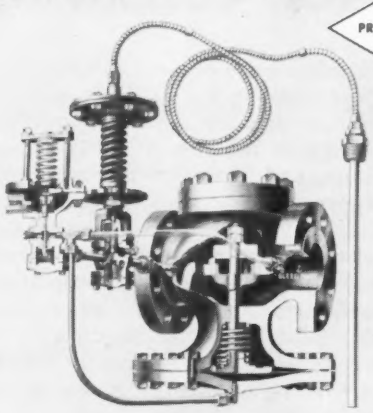
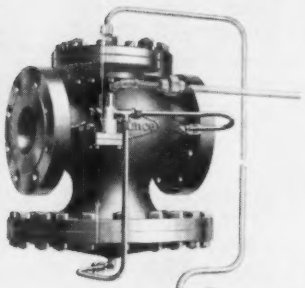


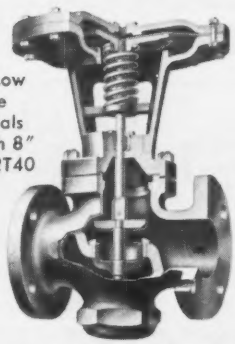
1. Instantaneous Heaters Spence ET124 Series



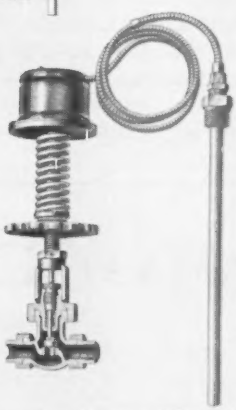
2. Storage Heaters Spence ET14D



3. Air Control Systems Spence EAT Series



4. Very Low Pressure Differentials 2″ Through 8″ Spence G2T40



5. Very Low Pressure Differentials Up Through 2″ Valves Spence Direct Acting T2

During the past year, our field representatives have reported many cases of improperly, and uneconomically, applied temperature regulators. To help you avoid some of these costly mistakes, here are a few tips on selecting the most effective and economical temperature regulating valves for your applications.

1. Instantaneous heaters require a special action for close temperature control and freedom from hunting. In the Spence ET124 series, steam pressure is modulated according to temperature (demand) and is automatically regulated at any pressure established by the demand.
2. Storage heaters, on the other hand, are more economically controlled by the Spence ET14D, which includes a simple temperature-actuated pilot that opens and closes the main valve to maintain a constant temperature.
3. Air control systems can now have a ±5°F control accuracy under wide and instantaneous load swings with the Spence EAT regulator. Engineers report savings of up to 50% in installed costs with this recently developed Spence cascade system when it has been used in place of conventional instrumentation.
4. For the combination of very low pressure differentials and air or water control, Spence recommends Type G2T40. This single seated pilot operated valve provides fast, positive response in 2″ through 8″ valves. Double seat Type G22 is also available in 10″ through 12″.
5. When very low pressure differential is encountered with valves of 2″ or less, the Spence direct operated T2 is recommended. The sensitive vapor tension thermostat responds quickly to small changes in bulb temperature for continuous, accurate control.

In this brief description of industrial process and heating temperature control, we have given a few important tips in proper regulator selection. If you would like more detailed information on these control applications, write for the new Spence Temperature Control Bulletin IV 1014. SE-150

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Administration Backs $100 Per Diem for Consultants

The Kennedy Administration has proposed to Congress that experts and consultants retained by Federal agencies be paid up to $100 per diem, and that responsibility for rules and regulations governing their employment be placed in the hands of the President. The recommendations came in a report by the Bureau of the Budget to a House Appropriations Subcommittee.

The report brought out the fact that present laws and regulations governing the employment of experts and consultants are a patchwork of inconsistencies which often hamper the activities of Government agencies. Accompanying the report was the draft of a bill to give the President authority to make Government-wide regulations covering employment and compensation of experts and consultants. Although the bill contains no specified maximum rates, the Budget Bureau report indicates the President would set the maximum per diem at $100, as previously urged by NSPE. "Since there are now several instances where individual agencies are authorized to pay up to $100 per day, " says the report, "and since this figure bears a reasonable relationship to the total compensation paid to career personnel in Grade GS-18 (after allowance is made for annual leave and Government fringe benefits), it is suggested that $100 per day be considered as an appropriate ceiling amount at this time, with provision in exceptional circumstances for rates in excess of this amount."

By placing authority to set rates and make regulations in the hands of the President, the Budget Bureau hopes to end present "inconsistencies and confusions," and provide greater flexibility.

A major feature of the report and proposed legislation is the proposal to have the President also set rates of compensation and make other regulations governing the employment of consulting firms retained on a contract basis rather than a per diem. Under a ruling by the Comptroller General, the present per diem limitations do not apply to contracts, and Congressmen have been highly critical of contract fees paid in excess of $400 per day to management consulting firms. The Budget Bureau feels Presidential regulations would adequately control this type of contract.

In statements made at hearings for 1962 appropriations, the Budget Bureau strengthened the case for the new legislation by citing several specific instances where important programs were hampered or delayed by the inability to obtain necessary consulting services at the presently allowed per diem maximum of $50. The Bureau witness stressed that the difficulties were particularly acute in the fields of engineering, science, and medicine.

GAO Criticizes Maine for Means of Letting Contracts

Federal-aid highway design contracts should be awarded on the basis of acceptable qualifications and favorable price quotations, according to the General Accounting Office.

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(Circle 8 in Readers' Service Dept.)

In a review of the Federal highway program in Maine, the GAO criticized the state highway department for heavy reliance on two Maine consulting engineering firms. Although the fees paid the consultants were within established professional society fee schedules, the GAO said engineering contracts should be negotiated with several firms "on the basis of acceptable qualifications and favorable fees."

Defending the state's use of established negotiation procedures, the Bureau of Public Roads said that the practice recommended by GAO would amount to competitive bidding. This would be "in violation of the codes of ethics of professional engineering societies and, therefore, the better consulting organizations would not bid for professional services."

Unimpressed, the GAO implied that consultants are less concerned with professional ethics than the BPR thinks. "To our knowledge a number of agencies of the Federal Government have invited qualified firms to submit proposals as to the scope and cost of professional services, and the practice apparently is not objectionable to the professional firms. Such proposals afford the Government a broader base for considering in appropriate relationship the scope of services offered, experience and skills of the respective firms in the particular services required, financial terms, and other pertinent factors."

In addition, the GAO report was firmly against the state's use of only two consulting firms for the majority of its highway work. A number of firms should be considered, said the GAO, "to avoid the appearance of favoritism that attaches to exclusive contracting with one firm." The Maine highway commission defended its practice on the grounds that the two firms used had high reputations and had always done superior work for the state in the past.

In line with past recommendations, the GAO also called for an end to per cent of construction cost design contracts. The report said that per cent-of-construction cost is a poor way to measure the value of engineering involved, and "does not lend itself readily to adequate control of fees because construction costs are governed largely by the engineering design drawn by the consultant."

The GAO report, signed by Assistant Comptroller General Frank H. Weitzel, was sent to the House and Senate, President Kennedy, the Secretary of Commerce, and the Federal Highway Administrator.

Kansas Official Opines on Supervision Case

In answer to a question from the state registration board, the Kansas Attorney General gave his opinion that an architect cannot legally undertake over-all design and supervision of a predominantly engineering project.

Quoting from a previous Kansas court decision, the Attorney General said, "While it is not practicable to draw a line of demarcation between the fields of professional engineering and architecture, the statutes indicate that the plans, designs and supervision by professional engineers should be essential phases of the development and accomplishment of an actual engineering problem or project or other engineering undertaking." The Attorney General said, therefore, that an architect could perform all phases of a project, unless the type of structure involved was clearly an "engineering undertaking," in which case ". . . supervision by professional engineers should be essential. . . ."

In another question, the Board said that older applicants for registration, who do not qualify without examination, find it almost impossible to pass the present written examination, which is designed primarily for the more recent graduate. The Board asked if it could prepare a less detailed examination for these older applicants. The Attorney General said that all applicants should pass the same examination, regardless of age, unless they were applying for registration by reciprocity, in which case a less detailed examination would be appropriate.

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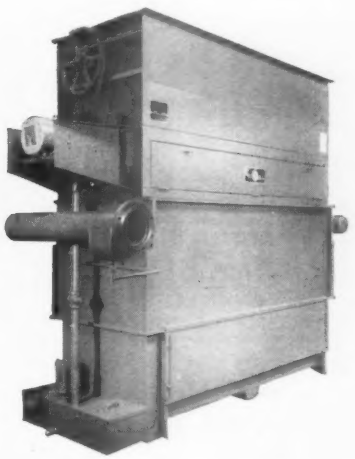

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Society Backs President's Bill for Water Resources

In a statement to the Senate Committee on Interior and Insular Affairs, NSPE has urged enactment of the Administration's Water Resources Planning Act. The bill would establish a National Water Resources Council, authorize the establishment of river basin water resources commissions throughout the Nation, and provide for financial assistance to the states for water resources planning.

NSPE endorsement of the legislation was based on official Society Policy (No. 55) which declares that the economy and efficiency resulting from establishment of a coordinating review board for the development of water resources would serve the Nation's best interest.

The pending bill, NSPE pointed out, offers a constructive approach toward a solution of five principal problems existing today.

(1) The need to improve coordination of Federal agencies with one another.

(2) The need to improve coordination between Federal agencies and the agencies of state and local governments.

(3) The need to make certain that planning uses the river basin as a natural unit.

(4) The fact that many states do not have agencies with the necessary authority and financing to carry out river planning and development.

(5) The need to measure the relative merit of projects with one another.

The NSPE position on the bill was expressed in a statement developed by Charles D. Curran, P.E., a member of the Society's Committee on Federal Engineering and Scientific Activities, and Southwestern Area vice-chairman for the NSPE Functional Section for Engineers in Government Practice. Curran is the executive director of the U.S. Study Commission—Texas.

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NSPE Praises CSC's New Engineer Qualifications

NSPE has commended the Civil Service Commission for a proposed change in existing qualification standards for Federal professional engineer positions which would extend the written examination requirement to cover grades GS-13 through GS-15 for those applicants who do not possess an engineering degree, or who are not currently registered as a professional engineer. This change is contained in a tentative draft of revised standards which the CSC currently has under consideration. It conforms to a proposal suggested by NSPE to the CSC last year.

"In our opinion," the NSPE statement read, "it is particularly important for the Commission to require either a college degree, engineering registration or appropriate experience, and the successful completion of a written examination as a basic requirement for eligibility for appointment to engineering positions at all levels. To impose less stringent standards for appointment to higher level, more responsible positions as compared to lower grades is a glaring deficiency. The proposed change will correct a serious shortcoming."

NSPE also suggested that a four-year qualifying experience requirement for a nondegree applicant be extended to at least eight years of experience, in addition to the successful completion of a written examination. The Society pointed out that the Commission's acceptance of four years' experience as equivalent to a four-year accredited engineering curriculum is not in conformity with current trends in engineering education and the ever widening breadth and scope of the material covered in the standard course.

NSPE suggested that the tentative draft of revised standards be amended to provide that for GS-5 to GS-11 positions, qualifying professional experience must be under direct professional engineering supervision. In this connection, NSPE pointed out that the four years' experience generally required as prerequisite to professional registration usually results in a situation where the typical Federal engineer has reached the GS-11 level before he has obtained the necessary experience. In order for his qualifying experience to be of such a character as to be acceptable for registration, NSPE recommended that it be ob-

tained under direct professional engineering supervision.

The National Society's comments were submitted in response to a request from the Commission's Standards Division. In general, NSPE praised the Division for developing a more meaningful and constructive approach for qualifying engineers for professional engineering positions. The tentative draft of proposed changes, NSPE said, "is in keeping with both the National Society's and the Commission's desire to continually raise professional engineering standards in Government, and to assure Federal agencies that progressive steps are being taken to provide well qualified engineering staffs at all levels."

Robbins Testifies Before Kennedy Task Force

On September 14, 1961, NSPE testified before President Kennedy's Task Force on Employee-Management Relations in the Federal Government. The Task Force, headed by Labor Secretary Arthur J. Goldberg, is studying all ramifications of employee-management relations in the Federal service and has until November 30 to submit its report and recommendations to the President. The text of NSPE's testimony follows.

My name is Paul H. Robbins. I am executive director of the National Society of Professional Engineers, a nonprofit membership organization composed of professional engineers in virtually every specialized branch of engineering practice and type of employment. All of the Society's 56,000 members are registered under applicable engineering registration laws which have been enacted in all of the states, several territories and the District of Columbia. Our membership is affiliated through fifty-three state and territorial societies and approximately 400 local community chapters.

Since establishment of the National Society over twenty-five years ago, we have been actively concerned with engineering employment practices as they affect the relationships between employed professional engineers and their employer, be it an industrial organization, a government agency, an educational institution or a firm of consulting engineers. Because of the accelerated growth in that important segment of the engineering profession who are employed by governmental departments and agencies, the National Society three years ago formed a special group known as the Functional Section for Engineers in Government Practice. Through the mechanism of our Functional Section, we have been able to concentrate to a greater extent in a variety of programs and activities which relate directly to the interests of governmental engineers.

Basically, our goal in this area is to enhance and promote the professional status and recognition of employed professional engineers through a program which stresses cooperation, respect and mutual understanding among the individual engineer, management and the professional engineering society with the objective of creating an atmosphere in government service which will attract the highest caliber of engineering talent. We would like to emphasize that engineering and scientific developments within recent years, and prospects for expanded Federal activities in these areas in the future, give every indication that the Government will require a continual growth of its engineering and scientific staffs. This prospect is borne out by a recent study by the Civil Service Commission which estimated that by 1963, engineer positions in the Federal service should grow to 65,550, an increase of 19.5 per cent over 1958 employment.

If the Government is to meet its personnel needs in this vital area, it is particularly important to create the proper climate for maximum employee retention and professional growth and development. This can be effected to a great extent by the type of employee-management relations in operation.

In the Task Force announcement of August 25, 1961, there appeared a listing of several topics which were suggested as possible areas for comment by those appearing at the hearings. In accordance with that suggestion, our statement will present the views of the National Society in relation to each of the points listed.

(A) We emphatically believe that the proposed Federal employee-management policy should clearly and definitely provide that employees are protected in their rights to join or refrain from joining any employee organization. Speaking of professional employees in particular, we believe that this group, more so perhaps than others, needs to be afforded a degree of freedom of choice which is consistent with their need for freedom of thought and activity in carrying out their assigned functions. This need is emphasized by the fact that professional employees perform work which is primarily intellectual, requiring the consistent exercise of judgment and discretion, and which is based on extensive formal education and/or experience.

(B) We believe that the proposed policy should be worded so as to assure an equal opportunity for all organizations having a membership in whole or in part of Federal employees to meet with agency officials and offer comments, suggestions and recommendations in the vital area of Federal personnel policies. We would view with disfavor any procedure or language which could be read so as to confine such rights to labor organizations or "unions of government employees."

As a professional organization, the National Society of Professional Engineers has a legitimate interest in the needs and desires of the members of the engineering profession who are employed by the Federal Government. Pursuant to this interest, the National Society, through our Functional Section for Engineers in Government Practice, has made contact with personnel officials in several agencies for the express purpose of discussing matters of mutual interest pertaining to continued progress in engineering personnel policies and practices. Officials in such agencies as the Department of Commerce and the Federal Aviation Agency, to name two, have expressed a willingness to cooperate with the Society and to accept the views of professional engineers on broad policy matters through our organization.

The National Society's continuing interest in promoting professional recognition and status for Federal engineers and in helping the Government improve its competitive position for recruiting and retaining qualified engineering staffs, has led us to meet only recently with the chairman of the Civil Service Commission and several of his key staff personnel. Needless to say, the chairman was most cooperative and receptive to our views, and we are confident that future meetings and additional informal discussions of current problems of mutual interest will continue to produce meaningful benefits to the Government and its growing numbers of vital engineering personnel.

We would hope that the opportunity presently afforded professional societies, technical organizations and other groups to meet with agency officials from time to time will not be curtailed in any way, nor, we trust, will any requirements be instituted which could adversely affect the relationship which presently exists.

We believe in an equal opportunity for all organizations to meet with agency officials and have their views considered. Specifically, we want to assure our opportunities to discuss engineering personnel matters on a professional plane in professional surroundings.

(Continued on page 53)

Meetings of Note

American Institute of Mining, Metallurgical and Petroleum Engineers—Annual Meeting, November 2-3, Los Angeles, California.

Highway Engineering Conference—November 9-10, University of Florida, Gainesville, Florida.

Society of Naval Architects and Marine Engineers—Annual Meeting, November 15-18, Waldorf Astoria Hotel, New York, New York.

American Society of Mechanical Engineers—Winter Annual Meeting, November 26-December 1, Statler Hilton Hotel, New York, N.Y.

American Institute of Chemical Engineers—Annual Meeting, December 3-6, Commodore Hotel, New York, New York.

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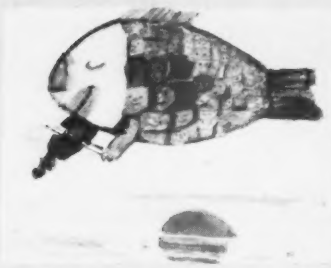

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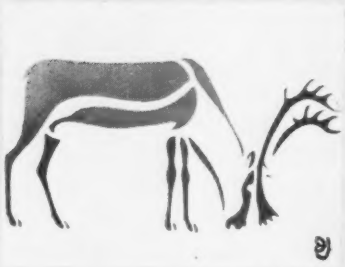

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Personalities . . . **Frank C. DiLuzio** has been named vice president—engineering for **Fairbanks, Morse & Co.'s** Beloit Group in Beloit, Wis. . . . **Vice Admiral W. Orme Hiltabidle** (USN, Ret.) has joined **De Leuw, Cather & Co.** engineers as a consultant with offices in Washington, D.C. . . . **Dr. Ralph A. Morgen,** president of Rose Polytechnic Institute in Terre Haute, Ind., has been named dean of graduate studies at **Stevens Institute of Technology . . . Saul S. Seltzer** has joined **Towers Properties, Inc.** as director of engineering . . . **Denis Temple** has been appointed director of development of **St. Lawrence Cement Co. . . . Phillips L. St. John** and **Robert E. Wetmore** have been made partners in the consulting firm of **Leigh E. St. John & Associates** of Binghamton, N.Y. . . . The election of **Philip B. Taylor** to the board of directors of **General Precision Equipment Corporation** was announced recently . . . **Dr. Nathan M. Newmark,** professor and head of the Department of Civil Engineering at the **University of Illinois,** received the 1961 Vincent Bendix Award of the American Society for Engineering Education recently . . . **Herman R. Wittrock** has joined the sales staff of **Herculite Protective Fabrics Corp.** as technical sales adviser.

Mr. DiLuzio

Stanley Engineering Company has opened a new office in Washington, D.C., to be managed by **H. Peter Guttmann . . . J. D. Hitch, Jr.,** has been appointed general manager in charge of international sales of **The Babcock & Wilcox Co.'s** Boiler Division . . . **John I. Snyder, Jr.,** was recently elected chairman of the board and chief executive officer of **General Aniline & Film Corporation . . . The Garrett Corporation** announced recently the election of **J. J. O'Brien** as a vice president of the corporation, and **Jack Lewis** as vice president in charge of manufacturing . . . **Food Machinery and Chemical Corp.** has appointed **Donald F. Doehnert** as a plastics engineer with the decorative laminate group at the firm's Baltimore, Md., research facilities . . . **Harry L. Jenter,** vice president-operations, American Steel and Wire Division, US Steel Corp., has been elected president of the **Association of Iron and Steel Engineers . . . Leach International** has elected **R. T. Mathias** as vice president in charge of sales . . . **Robert W. Kelly** has been promoted to senior civil engineer in the long range planning section of **Humble Oil & Refining Co.'s** Technical Division.

Mr. Guttmann

Research-Cottrell has named **William C. Osborne** as vice president in charge of engineering and research . . . **Elbert G. Bellows** has been appointed assistant to the presidents of **De Laval Separator Company . . . Sprague & Henwood, Inc.,** has announced the appointment of **Joseph Parker** as Nashville regional manager with offices in Juliet, Tenn. . . . **Edward H. Lillibridge** has joined **Marc Shiowitz and Associates, Inc.,** as a senior computer consultant . . . **Charles R. Eisenstein** has been appointed district manager in charge of sales engineering at the newly established New York office of **Badger Manufacturing Company's** Expansion Joint Department . . . **David E. Austin** and **Donavon D. Nickel** have been promoted to the status of associates in the firm of **Ketchum, Konkel and Hastings,** consulting engineers . . . **Infrared Industries Inc.** has appointed **Paul R. Bradshaw** to the newly created post of Western engineering representative for the firm's Photoconductor Division . . . **Edward Brown** has joined the staff of **Titus Research Laboratory** as a research engineer . . . **J. H. Dean** and **S. A. Palmer** will represent **Empire Equipment Company** in California and the Pacific Southwest.

Mr. Osborne

Walter R. Naas has been appointed director of foreign sales for **Buhr Machine Tool Company** . . . Advancement of **Raymond W. Whelan** to the post of chief engineer of the Industrial Products Division works of **Western Gear Corporation** was announced recently . . . **Thomas Allchin** has been appointed to head a Machinery Division created recently by **Fusion Engineering . . . Robert E. Stiemke,** director of the **Georgia Tech School of Civil Engineering,** was approved recently by the Board of Regents of the University System to be director of the Institute's Engineering Experiment Station . . . **Basic Products Corporation** has named **Charles H. English** marketing manager of its International Division . . . **Aaron Rosenthal,** formerly director of financial management of the National Aeronautics and Space Administration, has been appointed comptroller of the **National Science Foundation . . . Dr. S. Roy Morrison,** senior staff scientist at the **Minneapolis-Honeywell** Research Center, has been promoted to assistant director of the center . . . **Keuffel & Esser Company** has named **N. Bruce Weir** to manage their Philadelphia branch office.

Mr. Naas

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(Circle 11 in Readers' Service Dept.)

The Slide Rule and the Stethoscope

Engineering Your Health

By

ISRAEL LIGHT, ED. D.

United States Department of Health, Education and Welfare

AN ENGINEER was appointed recently to the faculty of a medical school. If this comes as a surprise to most readers, so will the following situations, all of which have a common denominator, namely, the contribution of the engineer: (a) A paraplegic GI able to shave himself and eat his meals unaided; (b) the physician arranging to keep his patient's heart beating steadily despite serious valve deterioration; (c) the discovery of a new virus; (d) a woman who had vaginal cancer detected in its earliest and most curable stage; and (e) a new diagnostic technique for studying arteriosclerosis or hardening of the arteries. The engineer was strategically involved in all these instances.

The increasing contributions of engineering, across the board, to medicine and health come as a great surprise to most of the public and to no small number in the medical fraternity itself, for that matter. Reasons for this ignorance are not hard to find. The public thinks of the engineer in terms of building bridges, constructing highways, erecting skyscrapers, and developing missiles. Advances in medicine and health are reported usually by physicians or research scientists at medical meetings and in professional journals. The great field of medical research is a distant land to many practicing physicians and a mystery to the public.

Although medical leadership is unassailable in increasing longevity, decreasing the death rate, alleviating pain, and finding cures, researchers themselves realize full well that many of their discoveries come more and more to practical fruition with the strategic assistance of the competencies, skills, and talents of engineers. It is no secret that medical research actively courts the engineer, as examples in later paragraphs will show. The increasing sophistication of research in the life sciences can be noted in the tools used. The butterfly net, the scalpel, and the forceps have been replaced by chromatographic equipment, the amino acid analyzer, the ultracentrifuge, the cathode-ray oscilloscope, the electron microscope, the radioactivity counter, and the atomic reactor, to all of which the engineer has made some contribution, small or large.

A variety of engineering specialists are involved actively in both part time and full time careers in medicine and health. The *mechanical* engineer is at work cutting down air pollution effluents which are suspected of contributing to bronchial ailments. The *chemical* engineer is devising ways of analyzing new types of potentially toxic contaminants in water supplies. The *aeronautical* engineer is working on the physiological effects of space travel on man. The *electrical* engineer has devised a portable heart-pacing machine to help the feeble beat of an overworked heart. The *nuclear* engineer is applying atomic physics to developing a deep-irradiation machine to treat lung cancer. The *sanitary* engineer is busy cutting down air and water pollution.

The role of the engineer in medicine and health is unique and conspicuous today only because of its extent. Without going back into the musty and dusty pages of history, it is a matter of outstanding record and pride in engineering as well as medical annals that physicians themselves give conspicuous credit to sanitary engineers for having served in the last 50 years as the field force that took medical research and discoveries out of the laboratory and applied them throughout the land to reduce many of the infectious, communicable diseases to the near-vanishing point by conquering malaria, typhoid, yellow fever, tuberculosis, cholera, and the enteric diseases. Thus began the systematic coordination of the physical and health sciences.

WHAT are engineers doing these days in medicine? The following examples of engineering interest and participation are representative. They have been drawn at random from medical reports, professional journals, newspaper accounts, and personal contacts for the period 1959-61.

A tool engineer in Ann Arbor, Michigan, working in his spare time, has developed a combination heat exchanger and bubble trap, described by surgeons as a "superb instrument" for controlling the temperature of circulating blood during surgery and for removing dangerous air bubbles. It can also be used to lower the body temperature quickly to permit surgical treatment of certain heart conditions and in some diseases and injuries that produce high fevers.

Thirty-five engineers of the Illinois Bell Telephone Company have volunteered their spare time

to develop machines needed in clinical research and therapy at the University of Chicago. They organized themselves informally into a group known as SAVE, Service Activities of Voluntary Engineers. They have come up with a three-ounce device that can count and keep a record of the human heart beat and be worn during a full day of normal activity. They are also working on an electronic stethoscope to give a visible and audible check on pulse rates and patterns during surgery. This cross between a stethoscope and an industrial inspection tool will also be able to pick up heart sounds too low to be heard through an ordinary stethoscope. SAVE is trying to come up with a particular type of computer mechanism to detect membrane disease in newborn infants, and an electronic calorimeter to measure and record changes in body heat.

In 1957, a group of San Diego physicians called upon engineers in the Convair Division of the General Dynamics Corporation to help them correct some shortcomings of an oxygenator pump they had recently purchased. The resulting improvements were hailed by surgeons and cardiologists as an important step toward reducing stress on patients undergoing open heart surgery.

Another item having dramatic possibilities is a miniaturized device that can be implanted subcutaneously or elsewhere in the body to correct heart block. The self-contained instrument, transistorized, measures five centimeters in diameter and 1.5 centimeters in thickness, including the battery.

Telecor, a new instrument designed for anesthesiologists, provides an electrocardiogram, body temperature, and heart sounds of the patient during surgery.

An obstetrician and an engineer teamed to create a brain wave synchronizer, portable, weighing five pounds, and requiring no connections or attachments to the patient. The apparatus has excellent potentialities for deepening or speeding up the induction of hypnosis, in the opinion of the team's physician member, who also stated, "It can make labor and delivery more gratifying experiences by reducing discomfort and the need for excessive analgesia and anesthesia."

Computers are helping scientists study a typical nerve system, the pupil of the human eye.

A recent development is an electronic diagnostic system for mapping the human brain. Scientists expect the technique to yield statistical data related to the origin of brain waves and thereby provide a new basis for evaluating brain disorders.

The electron microscope now permits magnification up to 250,000, and has opened wide tremendous possibilities in the study of viruses in particular.

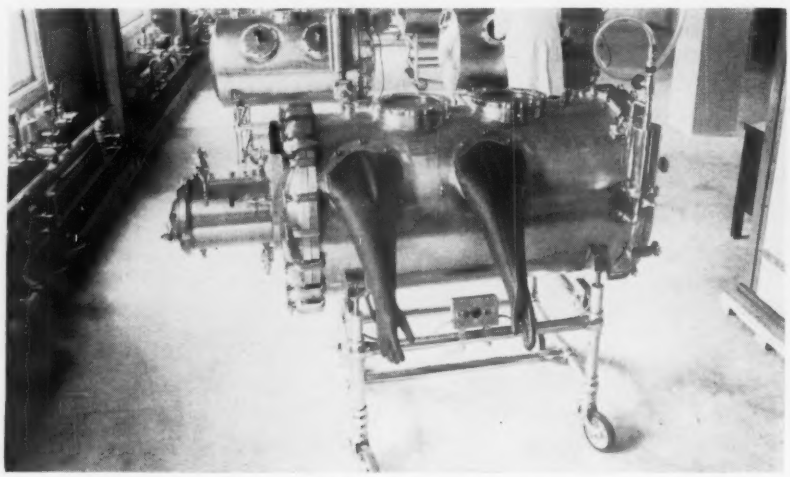
Sonar is being used experimentally to map the interior of the body.

The largest and most diversified set of data ever to be obtained on cancer survival is on its way from a 704 computer study conducted by the California State Department of Public Health. It was estimated that thousands of man-years would be required to do the computations by hand.

AN alliance of medicine, mathematics, and missile computers resulted in a technique designed to evaluate the responses of arteriosclerotic patients to various types of treatment. Preliminary results suggest the possibility of using this computer technique to detect hardening of the arteries in its earliest stages.

A radio transmitter has been built so small that it can be housed in a capsule which is swallowed by the patient and recovered in the bedpan, after telemetering physiological information on its tour through the gastro-intestinal tract.

Plans were disclosed recently to erect a test model of a small hospital fitted with electronic and automated devices which would periodically check as many as 20 different body functions — heart rate, respiratory rate, metabolic rate, blood pressure, electrocardiogram, etc.—and thereby "take the nurse out of the bookkeeping business and increase the time available for patient care."



Heavy rubber gauntlets enable a scientist in allergy and infectious disease research to handle germfree animals within the sterile tank.

A device developed initially for gyroscopes for use in connection with Polaris missile guidance systems has become a valuable medical research tool. The viscometer, which measures blood viscosity, has the advantages of requiring only a teaspoon of blood and can produce test results in less than a minute.

At an eastern university, engineers have been asked to help construct dental equipment in which the force applied, the speed, and the heat and vibration generated inside the tooth can be continually measured.

An electronic engineer and a radiologist told a conference on electrical techniques in medicine and biology that the future physi-

cian may have to learn electronic computer techniques and mathematical logic to make medical diagnoses.

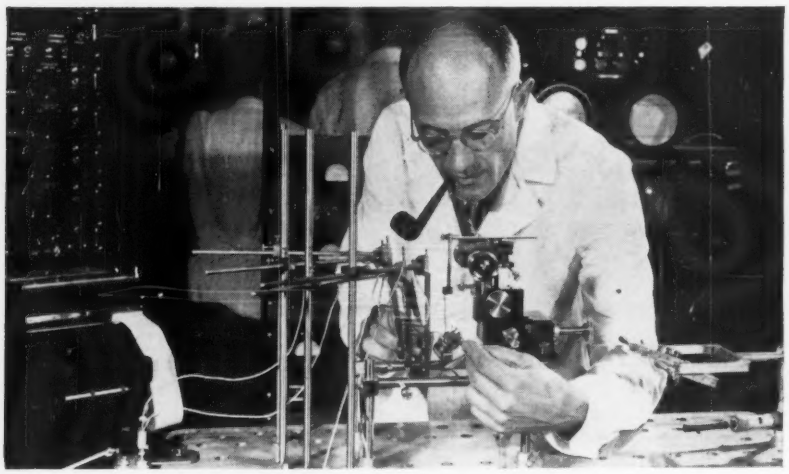
A 40-man instrumentation group in the National Institutes of Health, near Washington, D. C., includes a great range of engineering specialists who are bona fide members of medical research teams. The NIH is the research arm of the U. S. Public Health Service, and is perhaps the largest medical and biological sciences research center in the world. For example, an electronic engineer recruitment brochure from that establishment indicates that devices produced by the instrument section range from infinitesimal micro-electrodes and recording equipment for brain wave studies to a multiple-unit dual radioisotope scanner for detecting tumors.

Elsewhere at NIH, sanitary engineers are maintaining a germfree animal laboratory—completely free from micro-organisms—for mice, rats, and guinea pigs. Germfree technology is contributing to the development of the mass production of laboratory animals that are free from the usual bacterial and other infections found in the natural environment. Dietary, surgical, and X-radiation experiments with these animals have potential for further understanding and controlling the many diseases afflicting man in the environment.

The Public Health Service also maintains the Robert A. Taft Sanitary Engineering Center, in Cincinnati, Ohio, where such environmental problems as atmospheric and water pollution, radiological hazards, and milk and food contamination are under systematic investigation—both basic and fundamental as well as developmental and applied. The multi-disciplinary staff includes not only sanitary engineers but also physicians, biologists, chemists, physicists, bacteriologists, and such scarcer specialists as mycologists, limnologists, oceanographers, and meteorologists.

The sanitary engineer, as noted earlier, has developed a special role in and affinity for the health field. His background must include biostatistics, preventive health practices, occupational health and industrial hygiene, microbiology, and advanced chemistry—over and beyond the engineering sciences. With new problems in water pollution and new fields such as air pollution and radiological health hazards challenging the sanitary engineer, it is no wonder that a recent manpower survey disclosed that in proportion to the total estimated number of such engineers available, more sanitary engineers have master's degrees or better than any other group of engineers.

The Public Health Service thus includes a sizable component of sanitary engineers heavily invested in checking the air we breathe, the water we drink, the food we eat, and the places in which we live and work, with the prime aim of guaranteeing healthful conditions and a wholesome environment.

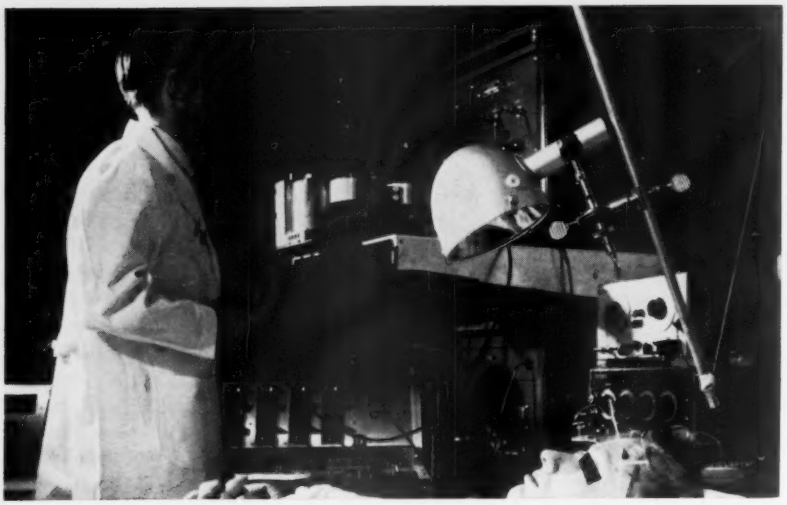


A neurophysiologist working in the field of spinal cord research checks electrodes used to record activity within a single nerve cell.

As a result of the increased involvement and collaboration between the physical and life sciences, new specialities have risen such as medical physics, biophysics, bionics, biomechanics, electrobiology, radiobiology, and bioastronautics. New societies have been founded such as the International Federation for Medical Electronics, the Biological Engineering Society, and the Biomedical Information-Processing Organization. Beginning in September, 1961, Johns Hopkins University and the universities of Pennsylvania and Rochester offered for the first time anywhere a Ph.D. curriculum in biomedical engineering. A study-conference on the role of biomedical engineering in universities and hospitals was held recently in Omaha, Nebraska.

The first annual symposium on frontiers in biomedical engineering was held a few years ago in Vermont. The Annual Conference on Electrical Techniques in Medicine and Biology has been held for well over a decade. The Fourth International Conference on Medical Electronics was held this past summer in New York. Medical journals now carry not only articles but also editorials stressing the benefits to be derived from collaboration with engineers. The *Medical Tribune,* for example, a 24-page, tabloid-size newspaper for the medical profession, regularly highlights research developments involving engineers.

The first issue of *Medical Electronic News* appeared in March, 1961. This publication is the first national technical trade journal to serve the infant field of biomedical electronics. "Few branches of instrumentation and electronics have more promise for the application of new devices and techniques than the comparatively recently opened field of biological and medical instrumentation and electronics. The application of better diagnostic tools will do much to relieve human suffering, conquer



The electroencephalograph (rear) and oscilloscope (center) are used at NIH to record impulses of the eye in electroretinography research.

disease and circumvent operative procedures. It is to fill this important objective that *Medical Electronic News* is designed."

The examples presented above of the engineer's involvement in the field of medicine and health suggest a growing professional intimacy with scientists and with scientific research. This increasing intimacy has given rise in recent years to careful consideration of the relationship between science and engineering, a consideration which, upon occasion, could be more accurately described as controversy. Recent professional engineering literature has included such titles as "The Merging Role of Engineering and Science," "Engineers and/or Scientists," and "Where Does Science Stop . . . and Engineering Begin?"

The conventional differentiation noting that science is basic and fundamental and that engineering is developmental and applied is becoming increasingly blurred. The time factor distinguishing technology from science is becoming smaller. More and more, the scientist and the engineer are indispensable to and feed each other.

By its own admission, the organized engineering profession confesses to have presented an inadequate picture of itself to the public. Therefore, many engineers who are worried about losing their professional identity because of the intimate link with scientists have recognized their concern for what it really is; namely, a public relations failure rather than any hard-and-fast, till death-do-us-part distinctions between the goals, procedures, and skills involved in science on the one hand and technology on the other. The either/or attitude is no longer tenable.

The "invasion" of medical-health research by engineers is more apparent than real—as an invasion! It is a natural evolution. More detailed accounts of the inter-personal relationships and inter-disciplinary activities, as in the examples noted in earlier paragraphs, would no doubt disclose intellectual cooperation and collaboration which defy meaningful separation.

The above recital of activities in which engineers have engaged is but a scratching of the surface in the field of research in medicine and health. No mention has been made of the engineer's contribution to artificial limb work: Post-World War II developments in prosthesis have been truly fantastic; skin coverings for plastic hands, complete with natural-looking painted veins, and moving fingers operated by muscles of the forearm or biceps. Nor has mention been made of the development of computers which can store, sort out, and analyze a great mass of medical data and health statistics. New hospital plans involve advanced air-conditioning and filtering techniques. Operating rooms are being redesigned to provide more space for more people and equipment at operating tables and also to provide more effective observation of surgery. The examples could be extended greatly in number and variety.

A small number of engineers (though growing larger all the time) are involved in life-time careers in this area. Many others devote part of their official time or spare time to such endeavors. It is clear, however, that if the major diseases of mankind are to be conquered, the engineer is to be an increasingly valuable member of the team engaged in this struggle. (In fact, many of the neurological diseases, for example, such as muscular dystrophy, multiple sclerosis, and cerebral palsy, could not be investigated at all until appropriate instruments of precise measurement, evaluation, diagnosis, therapy, and surgery were developed —with the assistance of the engineer, of course.)

If the engineer is known today primarily for his contributions to man's material comfort, he is well on his way to becoming almost as well known tomorrow for his contribution to man's personal health, long life, and well being.—**End**

About the Author . . .

Dr. Light

Dr. Israel Light's academic training and professional experience include the physical-life sciences and the social sciences. He is a former professional educator; served as consultant to the U.N. Atomic Energy Commission Secretariat and as research associate with such groups as the American Council of Learned Societies and the American Political Science Association; and joined the Federal Government some ten years ago in the Bureau of Labor Statistics. Since 1954 he has been with the Public Health Service as a medical science writer and information officer, and is currently affiliated with the Service's engineer component. He is co-author of *Sanitary Engineering Manpower*, a publication of the Public Health Service.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

". . . we happen to live, because of the ingenuity of science and man's own inability to control his relationship with one another . . . in the most dangerous time in the history of the human race."
—President Kennedy
At News Conference, Oct. 12, 1961

A Somber City ►

The President's statement represents the somber tone which pervades official Washington, particularly now that Congress has returned to the grass roots and primary attention focuses on the Executive Branch. Virtually all of the cold war programs, which so dominate the current scene, have a direct impact on the engineering and scientific community—space, disarmament, military buildup, atomic testing, fallout shelters.

It is obvious that all of these technically oriented programs will require large numbers of engineers and scientists. At the same time the stepped-up draft quotas and the calls to active duty of reservists are pulling some critical professional personnel out of their defense-related civilian work. Some companies are already feeling the pinch, and more of this may be anticipated. The most immediate problem area is in connection with the reservist call-up inasmuch as the draft calls are still in the lower age groups and hence less likely to hit key personnel. Firms which rely on engineering and scientific personnel for their progress would be well advised to check the draft or reserve status of each key employee and thereby be ready for any personnel switches which may be necessitated by a draft or reservist call. Once an employee's reserve unit is alerted to an active duty call it is too late for him to seek transfer to the Standby Reserve. Prior to the alert notice, however, regulations do provide the machinery for those with critical skills to be transferred to Standby units under certain conditions. Defense Department representatives have indicated that they will shortly issue a special memorandum directed to the critical skill area, outlining present policies and procedures for transfer to the Standby. This special memorandum will be reported in a future issue of the AMERICAN ENGINEER.

◄ *Too Many Secrets*

Rep. Melvin Price, chairman of the House Subcommittee on Research and Development of the Joint Committee on Atomic Energy, has lashed out at the doctrine of executive privilege, which, he said, keeps the reports of the President's Science Advisory Committee "secret not only from the public but from the Congress." He also suggested that the fact that many scientific advisers come from large industrial and university organizations "creates a sort of 'conflict-of-interest' problem." The Illinois legislator also called for more diverse scientific advisers, stating that "some of our scientists and administrators in the atomic field may be losing their pioneering spirit. Many of these achieved their reputations a number of years ago and are getting older in scientific outlook as well as in other ways."

Manpower Muddle ►

Responsibility for manpower studies and coordination, particularly that portion involving professional personnel, is still in something of a muddle in the Federal structure (and may ever be so). But Senator Clark of Pennsylvania made a considerable gain in the recent Congressional session toward achieving his idea of centralizing manpower responsibility in one agency. Originally, Senator Clark had proposed a Council of Manpower Advisers in the office of the President. When the Administration rejected this approach, the Pennsylvania solon caused to be inserted in the Manpower Development and Training Act provision for the Department of Labor to "appraise the adequacy of the Nation's manpower development efforts to meet foreseeable manpower needs and recommended needed adjustments. . . ." This would include such elements as utilization, providing work experience, training opportunities, information and communication on manpower requirements, statistical manpower studies, research and periodic reports to the President on manpower requirements, resources, use and training. The language in the bill specifically refers to the "critical need for more and better trained personnel in many vital occupational categories, including professional, scientific and technical and apprenticeable categories. . . ." The bill passed the Senate, and a companion House bill with similar language was approved by the House Education Committee, but did not receive clearance from the Rules Committee in time for action.

Manpower authorities in the professional-scientific field would prefer to have some other arrangement for study of their specialized needs, perhaps as a separate group or possibly within the office of the President's Science Adviser or the National Science Foundation. Even though it appears that the Clark Bill will be approved next year in its present form, there would still be the possibility of establishing a professional-scientific manpower operation independent of the Department of Labor, but with close coordination of the two study groups.

◄ Ribicoff Blasts Educators

The Federal Aid to Education battle is over for the time being, but there are still strong reverberations. The most notable of these was the recent blast by Secretary of Health, Education and Welfare Ribicoff who told the 44th annual meeting of the American Council on Education, "I don't think the people of this country really care about education and I am not so sure that you really care." He criticized the educators to their face for their "apathy" and for being concerned only with their particular segment of the over-all educational complex. Referring to the abortive efforts by the Administration to push a compromise aid to education measure through the Congress in the closing days of the session, Secretary Ribicoff said: "Did I find you (American Council on Education), the National Education Association or the vocational educators rallying around saying, 'let's put it through'? No. Everyone was looking out for his piece of education. These measures were necessary, but you educators were in your compartments. None of you was interested in doing things for education as a whole."

Secretary Ribicoff said the Administration will renew its fight for a broad-based program of Federal aid to education at the next session of Congress. Most observers presently think there is little chance for the Administration program in the second session inasmuch as it is an election year and the aid-to-education issue was most seriously clouded by the emotion-charged religious aid question.

Professional Profiles

Warren W. Parks, P.E. (seated) heads a family of engineers. Shown with him are his sons (l. to r.) Warren W. Jr., Edgar E., and Russell W., all outstanding engineers on their own.

WHEN it comes right down to contributing to the continuing excellence of the engineering profession, it can truly be said that there are few engineers who have done their part more fully than Warren W. Parks, P.E., of Cincinnati, Ohio.

The reason: Besides being an active and highly respected member of the profession himself, Parks has brought up three sons, each of them active in the engineering profession.

This is perhaps one of the major reasons why Parks was nominated as Engineer of the Year for Cincinnati in 1960 by three separate engineering societies, and subsequently given that honor. The American Society of Civil Engineers, the Ohio Society of Professional Engineers, and the Engineering Society of Cincinnati were unanimous in nominating and endorsing him.

Long active in Cincinnati engineering circles, Parks has been village manager of Indian Hill, Ohio, since 1943. Before this, he was resident engineer in charge of construction of the model town of Mariemont and subsequently became its chief engineer. He has held positions as field engineer, bridge department of the Boston and Albany Railway, and field engineer with Fay, Spofford and Thorndike.

Parks has devoted his entire career to one of the most important aspects of civil engineering—that of engineering the development of modern communities as orderly and pleasant places in which to live and work. In all of this work, he has skillfully worked in close contact with the interest of the public. He has shown great capacity to appreciate and to blend properly the technical with the human aspect of engineering work.

His civic activities are as fruitful as has been his engineering career. He was trustee of Worcester Polytechnic Institute for ten years from 1948 to 1958, and is now a trustee of the Ohio Municipal League and the Mariemont Community Church.

Professionally, Parks is a fellow in the American Society of Civil Engineers, a member of NSPE, and a member of American Water Works Association and the American Public Works Association. He is a life member of the Engineering Society of Cincinnati, and was the fourth president of the Technical and Scientific Societies Council of Cincinnati.

All in all, it is little wonder that Warren W. Parks, P.E., was chosen to receive the honor of Engineer of the Year in Cincinnati in 1960—and for the future, there are three sons who may soon be competing.

Information D

The problem of keeping engineers informed on what is going on in the field calls for a system of keeping track of research to avoid the duplication of effort that is so abundant in engineering research today.

LIKE Liza Doolittle in *My Fair Lady*, there are a growing number of engineers throughout the world who are being driven, at least figuratively, to shouting in exasperation, "Words, words, words, we are sick of words."

Unfortunately, the problem these members of the scientific community face is not the sort that can be solved in three acts on a Broadway stage. It is, in fact, a problem that looks altogether as though it will get worse before it gets better, and it is a problem that sits at the very foundation of scientific progress.

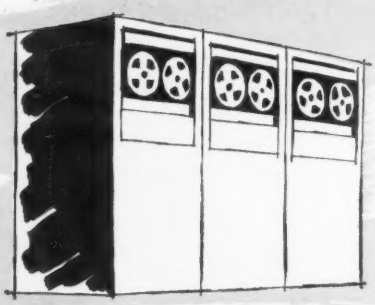
The "word" problem that today's engineer faces is, simply, that some sixty million pages of scientific information are published each year. Much of this information is uncodified, uncontrolled, and in many cases irretrievable. For the individual engineer working on a specific problem, it is not a matter of finding a needle in a haystack. It's more like picking a pebble out of an avalanche.

As surely as the first dislodged rock in an avalanche can pull down the side of an entire mountain, so has the volume of scientific publication grown at a geometric rate, with the engineering profession at the bottom of the hill, becoming buried ever deeper in the mounting volume of information.

Not so very long ago, one engineering executive was quoted as saying, "If a research job costs less than $100,000, it is cheaper for us to do it than to find out if it has been done before and reported in literature." In another instance, an engineer on the West Coast heard of a piece of Russian literature bearing on the work that he was doing at the time. He held off on his own work until he was able to get a translation—which, weeks later, turned out to be a re-translation of a monograph he had originally written himself. There is apparently a growing club of engineers who find that the work they have just completed has already been done by somebody else.

Money, time and effort are certainly being wasted because of the current situation of technical literature, and all of them in increasing amounts. But because of its magnitude, there is actually little that the individual engineer can do to protect himself from the ill effects of the problem, or to improve the situation as it generally exists today.

On the other hand, the old adage about "understanding the problem is half the solution," would seem to apply here. This is true because nearly everyone is aware that something is needed, and needed soon. They have made this need known, and at this writing growing attention is being paid to finding a solution. More public and private organizations are devoting time and serious effort to cope with the flood of information that has recently burst all existing levees of control. The engineering



ssemination

profession, incidentally, has done some real pioneering in this area.

Although it is still in the embryo stage, there is nonetheless an information industry growing up in the Nation. Also, many of the larger existing companies are taking definite and positive steps to sort out the heretofore unmanageable mass of scientific information that exists. And, thirdly, the government—acting as the largest research and engineering organization in the world—is moving in this area.

Indicative of what needs to be done is a recent report entitled "Information on Current Scientific Research" published by a Congressional Committee under the chairmanship of Minnesota's Senator Hubert Humphrey. Put out by a subcommittee of the Senate Committee on Government Operations, this report attempts to outline the government's stake and responsibilities in the information field. As such, it also offers an indirect statement for the entire scientific audience, for it is with this area of government operations that the report is concerned.

Six areas are listed in the report as being "especially challenging" and the degree of challenge involved holds true for the nongovernment scientist and engineer as well. They are:

"(1) Formulating a thesaurus of index titles for classifying research and development on a Government-wide and National basis; (2) developing standardization and compatibility of data processing systems, at least for all Government agencies; (3) correlating a central project registry with the indices maintained by different agencies, with information and data centers, with research documentation and with the National Science Foundation Register of Scientific and Technical personnel.

"Also, (4) establishing authority requiring contributions of research and development statistics and operations policies that would elicit wholehearted cooperation from all participants; (5) determining procedures for safeguarding and handling security data; and (6) defining scope of material to be indexed—whether research, or research and development. Related to this question is the possibility of establishing a correlated and unified but not necessarily centralized index."

In simpler terms, this means that there are some very basic criteria that need to be established before any really wide gauge attack can be made with a chance for success. Even at this, it is worth remembering that the Government here is only talking about itself. To this degree, it is blessed with some small amount of standardization to begin with. To go out into industry, where there is in all likelihood an even greater divergence of language, is to add to the difficulties that will be encountered along the way.

It is worth noting that to date, it has tended to be the larger in-

dustrial firms that have accomplished the most. Standard Oil of New Jersey, International Business Machines, DuPont, General Dynamics and Lockheed Aircraft Corp. are typical examples. The reason for this is, again, basically related to the size of the job at hand. The amount of money that is involved in making any sort of a fruitful attack on the over-all information problem is simply prohibitive for the smaller business, if it is to work on an in-house basis.

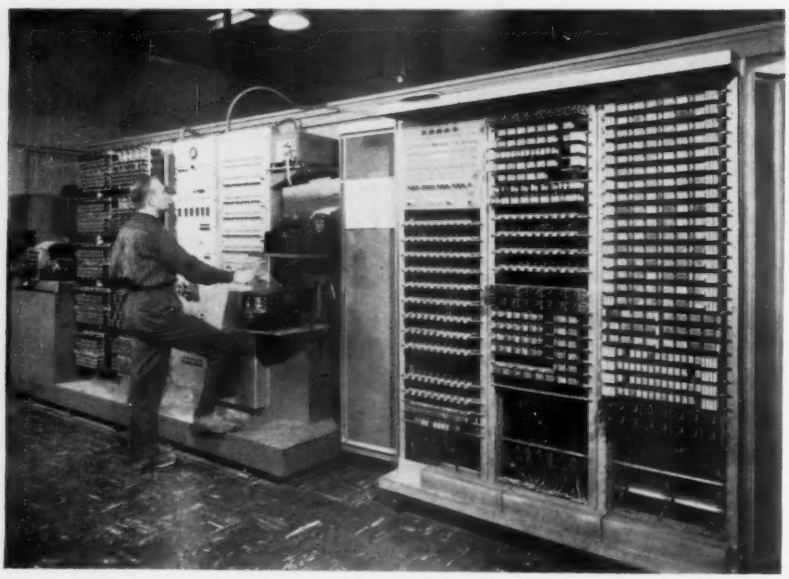
A measure of the cost involved is provided by Standard Oil of New Jersey. The division which handles this sort of work for Esso costs on the order of $1-million to operate yearly, and carries a staff of Ph.D.'s that would turn the heads of many U. S. companies green with jealousy. Esso feels that the division pays its own way, and can cite the cases to prove it. But whether the job could be handled effectively at less expense, and if so, whether it would provide enough benefits to a smaller, less diversified company, are questions that seem to be open.

In its simplest form, the information problem as it exists today is one of selecting very small and specific bits of information out of a huge, uncoordinated mass of data. It is a matter of giving the engineer at his desk the ten-page article out of sixty million available pages that will be of real use to him, without having to literally bury the man in his office with a truckload of printed matter.

Because this is the nature of the challenge, and because a great selection of automatic data processing machines have been designed to handle just this sort of work, a good deal of thought has been given to their application. Going one step further, some companies have developed information retrieval systems.

One of the largest and most recent of these developments was engineered for Central Intelligence Agency by IBM. The system has a capacity of some 99-million items, and can select them out for use momentarily. Using microfilm, the IBM device can handle such diverse items as scientific reports, engineering drawings, legal documents and other industrial records. The total system includes a computer/index, cameras, microfilm documents, and a hundred bins with 990,000-microfilm capacity each. Perhaps significantly, IBM has not disclosed the price of the system.

Computers, such as the one shown here, may eventually ease the problem currently facing the scientific community. But before their high capacities for detailed work can be used, much groundwork will be necessary, in the form of indexing, coding, and translation to machine language.



Besides IBM, there are a number of other companies, government agencies, and small research organizations looking into computer applications that could be helpful in managing the heavy flow of technical data. Unquestionably, computers offer one answer to the rapid and accurate *retrieval* of information.

But perhaps more basic is getting the information in shape for the computers. The complexity that this involves can hardly be imagined. For instance, less than half of the world's technical literature is printed in English—the remainder is in just about any language that could be named. The bulk is made up of literature in French, German, Russian and Chinese. Further, codification, even assuming similarity of language, can only be called mammoth. As one NSF information expert phrases it, "The computers are glamorous, but technically, they're 'way ahead of us."

For translation, people working in this field have turned again to computers, but this probably represents one of the single most difficult jobs that has ever been handed over to the mechanical brains. In the first place, most people who were exposed to second year French will recall that translation is a time-consuming and imperfect art—all languages have nuances of meaning, word similarities and, local complexities that can throw off any but the best and most alert translator. Couple this with the fact that a computer is only as good as the information that has been programmed into it, and an idea of the scope of the job becomes clear.

Even letting translation go by, to concentrate on English language technical material, there still remains the task of codification. It is significant that the Humphrey Committee cited the need for a thesaurus of index titles as number one on its "most challenging" list. There could be no more basic item in sorting out the inundation of technical material that is currently generated.

Perhaps logically, a number of Government agencies are doing

much of the pioneering work in this area. Logically, because by virtue of its huge stake in U. S. research and engineering, the Government is in a better position, simply by the variety of the work it does, to search for the necessary common denominators. For any individual private organization to go much beyond its own particular sphere of interest would be largely impractical, and, given the size of the job it would be prohibitively expensive for even the most altruistic industrial corporation.

THERE are several efforts within the Government; Armed Services Technical Information Agency, Commerce Department's Office of Technical Services, and the Bio-Sciences Information Exchange are three of the best known and most experienced. National Science Foundation has been charged with over-all coordination of Government efforts in this field, and because of this responsibility forms a logical focal point for Government activities. For NSF, the job entails such things as insuring that index or computer systems maintain a basic compatability, insuring that interested parties in the information field are kept as informed as possible, and generally keeping different efforts directed against the information problem in contact with each other.

For two reasons, the engineering profession has not been hit quite as hard as, for instance, has the theoretical physicist. The first and most basic of these reasons lies in the type of information that the individual engineer is likely to need in his job. Generally, it tends to be more specific than that desired by the pure scientist. As one example, where the engineer may be interested in the known tensile strength of a given metal, the scientist may have more esoteric questions about various means of improving this strength through new alloy processes. This example, of course, is over-simplified, but this sort of thing has given the engineer a slight edge over many of his professional colleagues.

The second reason, which partly rises out of the first, is that the engineering technical societies have been able to move ahead in the area of indexing information. A group of these societies have gotten together to publish an *Engineering Index,* a compilation of abstracts of published engineering reports. The *Index* is published by a group called Engineering Index, Inc., in connection with various technical societies.

Also, the individual societies are active in this area. One good example of this is offered by the American Institute of Chemical Engineers. Their stated aim is to set up an information clearing house to avoid undesirable duplication of research efforts, as well as to inform investigators of other activities in their fields. Besides operating a clearing house, the AIChE Subcommittee on Research Needs solicits suggestions for research needs, catalogs research suggestions in a booklet for distribution to universities and other organizations, and publishes articles in the technical press of importance to chemical engineers, such as compilations of urgent research needs and state-of-the-art papers.

In a sense, the situation is something like the old story of the blind men and the elephant. Generally speaking, the several interested parties are describing and attempting to find an answer according to their own particular positions and needs. And certainly, the problem is elephantine in size.

To date, considerable progress has been made, and at a rate that is acceptable given the size of the job. Also, the specialized approach to tailored solutions will probably offer the fastest progress in the long run. This is true simply because the mobilization of effort, money and manpower that would be needed for an over-all attack would recreate the original complexities.

Clearly, there are not now, nor are there likely to be any pat solutions for the burgeoning mass of technical data that is flooding technology. But a continuing and thoughtful effort on a number of fronts should do much—as it already has—to harness the deluge. **—End.**

CATE—Current Air Force Technical Effort

A good indication of the complexity of cross-indexing that is involved in any attack on the information problem is offered by this extract from an Air Force sponsored glossary and index system.

Acuity	definition, resolution, resolve, resolver
Acute	critical, severe, severity
Adaptation	adaptive, conformal, conformity, self-organizing
Adaptive	adaptation, conformal, conformity, self-organizing
Adaptor	connection, connector, contact, coupler, coupling, interconnect, jack, joint, junction, lanyard, link, linkages, plug, socket, terminal
Adder	comparator, summer, totalizer
Additive	
Adhesion	adhesive, bond, bonded, bonding, cohesion, joining, joint
Adhesive	adhesion, bond, bonded, bonding, cohesion, joining, joint
Adiabatic	
Adjust	adjustable, alignment, autotune, change, changeable, compensating, compensation, erection, erector, exchange, orient, trim, tunability, tuning
Adjustable	adjust, alignment, autotune, change, changeable, compensating, compensation, erection, erector, exchange, orient, trim, tunability, tuning
Adjustment	
Administration	control, controlled, controller, controls, director, directs, drive, guidance, guide, management, metering, regulate, regulation, regulator, regulatory, steer, steerable, supervision

Report on a Case by the Board of Ethical Review

The Board of Ethical Review was established to provide service to the membership of the NSPE by rendering impartial opinions pertaining to the interpretation of adopted Canons of Ethics and Statements of Policy regarding professional conduct. The *American Engineer* will print findings on specific cases as they are reported by the BER to the NSPE Board of Directors.

Case No. 61-1

Subject:

Use of PE Seal on Political Advertisement — Canon 2 — Canons of Ethics; Rule 3—Rules of Professional Conduct; NSPE Policy No. 61.

Facts:

A registered engineer, as a candidate for election to a public office, was the subject of a political advertisement containing his photograph and a reproduction of his professional engineers seal. The paid political advertisement was as follows:

"Vote for John Doe—We need an engineer on the Port Commission! That's simple common sense, isn't it? John Doe is an experienced licensed engineer with years of rich accomplishments. He is a builder who disdains delay. He acts now! Sound in decision. As an engineer, he stands highly regarded in wide areas.

"John Doe has effectively performed his engineering skills here at home as the elected _____ County Engineer, in the building of the famed Alcan Highway into Alaska and on important projects in Latin America.

"As an elected public administrator he has served on the board of _____ Commissioners in highly creditable manner and also as an elected member of the State Legislature. And today is serving in stellar manner as an elected member of the _____ City Council, where his wisdom and judgment have stood out in behalf of the people. Doe has earned the public's positive confidence.

"The _____ Port Commission has long needed an engineer as one of its members. John Doe is that man!

"We need an Engineer on our Board of Port Commissioners. (Paid Political Advertisement.)"

(Note—Also shown on the advertisement were a photograph of the candidate and a reproduction of the PE seal.)

Questions:

1. Is the text of the advertisement unethical?

2. Is this an appropriate use of the seal?

References:

Canons of Ethics—Canon 2—"He will not advertise his work or merit in a self-laudatory manner and he will avoid all conduct or practice likely to discredit or do injury to the dignity and honor of his profession."

Rules of Professional Conduct—Rule 3—"He should seek opportunities to be of constructive service in civic affairs and work for the advancement of the safety, health and well-being of his community."

NSPE Policy 61—"The state engineering registration laws generally specify and require that a professional engineer affix his seal to engineering plans, drawings, specifications and other documents applicable to his professional practice. The purpose of this requirement is to indicate the professional qualification, and legal certification of that fact, of the person or persons responsible for the preparation of the engineering documents.

"It is clear that the intent of the state laws will be clouded and the protection accorded the public will be endangered if other indicia having no relationship to the professional qualifications of the person or persons preparing the engineering documents are added, unless required by law."

Discussion:

It is universally agreed that the professional engineer has a right, and even a duty in the general sense, to be active in the political affairs of his community, state and nation. Eminent leaders of the engineering profession have long pointed to lack of political activity on the part of professional engineers and have urged them to seek political office at all levels of government in order to provide the public with the kind of desirable public service which may be expected from one with specialized training and experience in many aspects of governmental activity related to engineering implications. The need for such public service on the part of professional engineers is all the more urgent today as the machinery of government becomes increasingly dependent upon technical knowledge and experience. Rule 3 supports this attitude, and there is no more effective way to implement its philosophy than for professional engineers to work directly as representatives of the public in political organizations.

Question 1. In the instant case, the professional engineer seeking public office stressed his engineering competence and background. We think this was proper and appropriate to the circumstances. While the professional engineer may not advertise his merit in a self-laudatory manner as related to engineering services as stated in Canon 2, we do not read this as requiring him, as a candidate for public office, to hide his light under a bushel or to refrain from advising the voters of the facts on which he bases his claim for election to office. In the realities of political life, the professional engineer should not be placed at a disadvantage and forbidden to recite those personal qualifications which he believes the voters should

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UNIONS . . . A Case History

In July this year, AMERICAN ENGINEER *included an article titled "Engineering Unions—Dinosaur in the Space Age," showing the general trend away from unionism among professional engineers in industry, and outlining the general weakness that engineering unions incorporate. One result of this article was a question: What happens in the individual company situation when these general principles are applied? Or even more specifically, what makes the individual engineer decide that unions aren't for him? At Minneapolis-Honeywell in 1956, the existing union was voted out. The election was unique in that both "professional" and regular unions were involved, and both were soundly defeated. Here, as a follow-up to the July AE article, is the story of that election, and the issues that decided it. Telling the story is T. E. Larsen, a member of the Honeywell Engineers Club.*

WHEN I arrived at Honeywell in 1955, the Federation of Honeywell Engineers was affiliated with Engineers and Scientists of America (ESA). Earlier in the year a strike against the company failed because of the absence of support by the factory personnel, who compose Local 1145 of the Teamsters Union. There was a certain amount of antagonism between the striking and non-striking engineers, and without a doubt a feeling of weakness on the part of the Federation leadership.

I attended a membership drive dinner given by the Federation for new engineering employees early in 1956. I asked specifically if the leadership had any intention of affiliation with a trade union, and was assured that they did not. One year later, in February of 1957, a plan was presented to the Federation members (and was accepted) for affiliation with the United Auto Workers. The membership of the Federation was approximately 50 per cent of the bargaining unit. It included both technicians and engineers.

My opposition to this move was known to a group which later became known as the "decertifiers". I was met, on return from a business trip, by one of these "decertifiers" at the Minneapolis Airport. It was 1.30 a.m. on a crisp winter morning, and he handled the meeting with all the drama of a skinny Alfred Hitchcock. This seems humorous to me now, but when we reflect that he was asking me to join a group in doing battle with a powerful union leader, my grim acceptance seems justified. The chances for success or failure seemed about even.

This "decertifier" group intended to petition the National Labor Relations Board for a decertification election, and had started a post-card-petition movement. Proper notice had been made to the NLRB and the company by a lawyer who had been retained by the group.

The company management decided to pull out the stops and do everything they could to remove the union, and they requested that the NLRB conduct a certification election on the grounds that the Federation was not representative of the bargaining unit. They gave as evidence: (1) The membership was less than 50 per cent of the unit; (2) a substantial number of engineers had expressed opposition to the union (the "decertifiers"). ESA came on the scene as a third party and made the certification election the only alternative.

These actions may have saved the day for the "decertifiers", because the road to decertification is a long legal battle with few precedents to form the basis for NLRB decisions. However, I was personally disturbed by the move on the part of the company since it was possible that action on their part could bring an unfair labor practice charge which would void the election. Furthermore, I considered the union situation a problem that should be handled by the engineers themselves.

The amount of mail sent to the engineers and technicians during the campaign prior to the election was certainly excessive. Letters from ESA, the company, UAW Local 1701 (the Federation), and the "decertifiers", were thrown daily into the waste baskets of those they attempted to influence. I am sure that the only people who read everything that was written were those who had already made up their minds. They were looking for flaws in the argument of the other party, and many flaws were found. The Federation persisted in the use of half truths in their attacks on the company. Our group tracked these "rumors" down and converted them to the full truth which usually didn't make the company smell too bad. I believe this is one area in which we were effective. A couple of letters from the company contained material which tended to offend rather than befriend the engineer, and we were effective in modifying their approach. This, because we had an organization which could feel the pulse of the campaign.

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Read Well to Write Well

By

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THAT engineers and scientists are generally poor writers seems to be accepted as an axiom these days. Articles in many magazines tell us that it is true. Public statements by people who are presumed to know about such things assure us that it is true.

Like most general and sweeping statements, however, it is only partly true. Some research and development workers are poor writers, as are some novelists, some historians, some English professors, and even some writers about writing. This article is about those engineers and scientists who are poor writers and about some of the things they can do to improve their writing ability.

Good advice on the subject of technical writing is plentiful and inexpensive. Nearly every book publisher has several titles in his catalog. Most magazines intended for laboratory workers carry articles on the subject from time to time. How has the situation improved as a result of all this exhortation? Well, widespread rejoicing hardly seems in order. Most of the targets of the blasts seem unmoved. Or, if they react at all, it's to resist. Frequently they don't know what the fuss is all about.

Too many engineer-writers have excellent control of engineering jargon, but are limited in their ability to use basic forms of expression.

Many of the poor writers have been required to complete perhaps one course in composition, or "Freshman English" in college. From there on, they have been required to produce various types of term papers, reports on study projects, and assorted other samples of writing, including masters' and doctors' theses, although little attention has been paid to the quality of the writing that they have produced.

They have read textbooks written by other engineers and scientists. They have read technical journals and engineering magazines. Their entire reading as well as their writing experience has been in "scientific" language, which has in the process become very much ingrown and self-perpetuating of its major faults.

In short, the research worker's reading may be as much the cause of his poor writing as any other one thing. His mind is so full of the peculiar phraseology dear to the profession that he has only to push buttons in his mind and the stock phrases—trite, superfluous, ambiguous, inaccurate, meaningless—flow onto his paper just as stock sentences and paragraphs flow from a robot typewriter. He

has not become intimate with more than a fraction of the vocabulary and the store of rhetorical devices that are available to him. He has not developed a "feel" for language.

What can the individual do to improve his writing? He must somehow develop an interest in language, in the fine shades of meaning of words, in clearly and finely turned phrases, smooth-flowing unambiguous sentences, well constructed paragraphs joined in logical, well ordered sequence.

The following suggestions are intended for those who really want to develop a finer appreciation of the basic tool of human communication—language.

There are many ways of achieving the desired end, and only you can decide which way is best for you. Be wary of anybody who has a pat formula for you to follow; he has the couch of Procrustes ready and you'll very likely find it painful. Make your own bed from some of the following items, and see if you can make it comfortable.

CONSIDER first your educational background. Did you take any "cultural" courses in college? What did you learn from them? Did you acquire any kind of appreciation for fine English prose? Do you remember any of the things you read in the literature courses you took? How long since you have reread any of them? No matter what you thought of them at the time, try some of them again and see how they strike you now. If you have matured any in the interim, you should have a new and deeper appreciation of some of them; you may have out-grown others. Browsing among them should at the very least be a welcome change from the kind of reading you must do most of the time on the job and from run-of-the-mill television programs.

There is, of course, much argument about what is good writing and what is not, but that doesn't matter very much. Fortunately, there are many pieces of literature that are almost universally recognized as good. Browse through any list of the "World's Greatest Literature". You will probably find something to your liking, or at least endurable. You don't have to read Shakespeare, or Browning, or Shelley, or Keats, or Tennyson, if they are not to your taste. If you scorn the more romantic and effete moods and emotions, you'll still find plenty of blood and guts on the lists of greats. Sample some Kipling, Robert Louis Stevenson, Thomas Hardy, or Edgar Allen Poe. Pay attention to the author's language. Notice his choice of words and his sentence construction. Look up unfamiliar words in the dictionary.

Don't have time for extracurricular reading? Then your reading habits are probably faulty, and that's another area in which a little do-it-yourself effort will pay off. There are several good books on the subject. Reading courses are offered in many places. If your company has a training office, consult them for reading training available to you. But reading training is another subject. . . .

If the reading that is being urged on you is to help you, you must make some preparation for the program. You must develop in the process a feeling and a liking for words, their precise meanings, and the fine shades of difference in meaning between very similar words. Test your present "word power" (to use a *Reader's Digest* phrase) by answering these questions: What is the difference between "expecting" an event and "anticipating" an event? What is the difference between being "anxious" for an event to take place and being "eager" for it? What is the difference between "implying" something and "inferring" something? Can you define "adapt", "adept", and "adopt"? When can something be properly described as "exotic" or "glamorous"? See what the dictionary has to say about these words.

A good dictionary is absolutely necessary to your reading program. You should have a desk copy for yourself anyway. If your employer expects you to write anything, he should see that you are supplied with one. You should also have access to a large one, like Webster's Unabridged. As an experiment, look up "expect" and "anticipate" in a desk dictionary, then in the unabridged and see how much more you learn from the unabridged.

For improving one's reading and writing abilities, a dictionary is man's best friend.

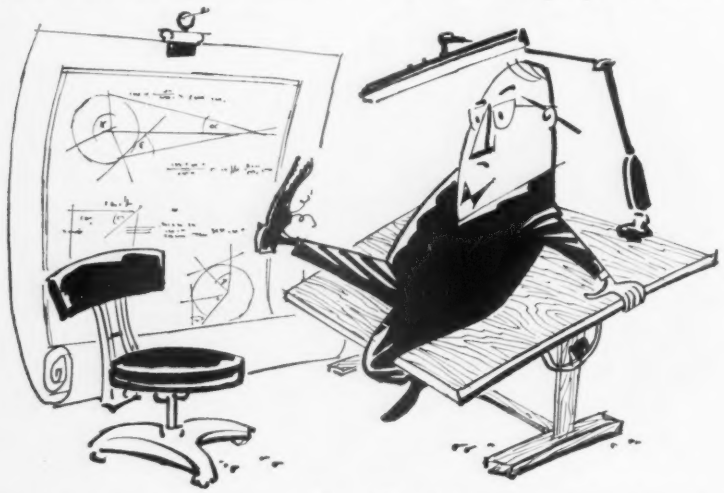
You must be thoroughly familiar with the dictionary you are using to get the most benefit from it. Read all of the front matter thoroughly to learn how your dictionary presents its information. Does it give the common current meaning of the word first and then work back to the archaic meanings, or does it give the earliest meanings first and work forward to the most recent usage? What do the abbreviations mean?

Dictionaries also contain much other useful information, like common rules for punctuation and capitalization, although these may be prescribed for you in a com-

pany "Style Manual". More about style manuals later.

You should have access to a good reference work on English grammar and usage. Perrin's *Writer's Guide and Index to English* is one such work. Some people find a dictionary of synonyms and a thesaurus indispensable. Fowler's *Modern English Usage* is a generally sensible and commonly consulted authority.

If your writing is to be free of regional peculiarities and shop talk, you must become familiar with the standard idiom—such details as the standard preposition to use with "compare". Do you compare something "with" another thing or "to" another thing? Is "prefer" followed by the infinitive or the gerund? Do you prefer "to travel" by train, or do you prefer "traveling" by train? Some information of this kind is available in the dictionary. Perrin's *Writer's Guide* is another good source. So is *Words Into Type* by Skillin, Gay, and others. Fowler is a good source, but watch out for British peculiarities in it. The most complete reference book on the subject is Funk and Wagnalls' *Standard Handbook of Prepositions, Conjunctions, Relative Pronouns and Adverbs.*



Trade jargon and time-worn cliches, like old shoes, are fine for private use, but make poor impressions in public.

You must become familiar with the tools of the writing trade just as you have no doubt become familiar with the tools of the drafting trade, and you must use those tools just as precisely.

When you have prepared yourself with the tools and learned something of how to use them, you are ready to start using them in your reading. Read a familiar textbook that you have consulted many times and are very familiar with, but do not read so much this time for content as for the author's mode of expression. Question his use of words and phrases. Stop to consider how you would have said the same thing. Even if you agree with the way he has said it, try to figure out other ways of saying it. Question his use of words. Compare the meanings of words he uses with those of words you would substitute. Look them up in the dictionary and decide which of you has chosen the most exact word for the purpose. Check his use of the short connective words against the "standard" given in the Funk and Wagnalls book. What percentage of his writing could be called "jargon"?

Try to figure out ways of condensing what he has said without losing the meaning. Has he inserted superfluous words that add nothing to the meaning? Has he used a fancy word when a simple everyday one would have done just as well or better? Would an English-speaking foreigner have trouble understanding it?

Make a list of words and phrases that turn up most often in what you read—your usual reading. Read something that you yourself wrote last year and make a list of the words that you have used over and over. No doubt *employ, utilize, initiate, conduct, procure, prior to, character, quantity, black in color, in this case, particularly in respect to, in view of the fact that, from a purely scientific* (or engineering) *standpoint,* or other similar tired and tiresome expressions will turn up on your lists. Check all of these words in the dictionary. Are they really necessary? Can you think of any substitutes?

Or do you perhaps agree with the engineer who said he found such words and phrases comfortable, like an old shoe? If you do, just remember when and where you wear old shoes. You don't wear in public old worn-out shoes that have lost their polish, particularly if you want to impress anybody. Whether you admit it or not, most formal writing is intended to impress somebody.

When you read something that seems clearly developed and easy to follow, compare it to something that was tough going for you. Try to figure out how they differ. It may be the subject matter, but most likely it's the style of the writing.

What is "style"? It means many things to many people. It has to do with the choice of words and the way they are put together in a sentence; the placement of modifying words and phrases in a sentence; the punctuation; the paragraphing; the use of abbreviations. It has more to do with rhetoric than grammar. Style can be good or bad; it can be completely lacking.

Some literary writers develop a very pleasant individual style that is easy to read and quickly identifiable. This kind of style is generally not desirable in a technical article, except for the easy-reading feature, even if you are clever enough to achieve it. It would detract from your main purpose, which is to convey information, not to titillate the emotions of your readers. If you want to experiment with self-expression in language, write novels or essays or letters to the editor or a sports column—or better yet, write poetry—but don't experiment in technical reports and journal articles.

A "Style Manual" is a guide to

consistent practice, and has little to do with literary style. Many questions about the use of language and its presentation in type cannot be answered absolutely. The difference between right and wrong is not clear cut, yet some choice must be made for the sake of consistency. Style manuals prescribe a choice. Every newspaper and magazine, and nearly every book publisher has a style manual that specifies the local ground rules for capitalization, hyphenation, punctuation, symbols, and abbreviations. Most companies that publish reports in any quantity have style manuals that specify these things, plus formats for various kinds of reports and other publications. Their style manuals give rules for writing abstracts and summaries, tell you how to cite references, and advise you on many other details. If your company has one, by all means study it. If you don't know what we are talking about, try to get your hands on a copy of the Government Printing Office Style Manual or *A Manual of Style* published by the University of Chicago Press.

Be receptive to the suggestions of your editorial office, if you are working for a company that maintains one. Cooperate with the editors. Learn from them; don't fight them. They do not deliberately try to irritate you by rearranging or cutting your masterpiece. It goes out over your name, not theirs, and they get very little credit for their efforts on your material. Their only concern is in doing a good job for the company and for you. If you believe that they have distorted your meaning by some revision, it is most likely that your meaning was not very clear to start with. They will discuss it with you reasonably.

Don't mistake personal mannerisms in language for a personal "style". Don't insist on introducing your conclusions with "it would seem that . . ." and using similar mannerisms if an editor cuts them out—and he probably will, if he's any good!

FIND any interest in all we have been talking about? If you're not yet ready to admit that it's interesting, do you at least find it comprehensible and tolerable? Good! There's hope for you.

Or is it all a mess of silly, unimportant details not worthy of your attention?

You most likely have been subjected to considerable study of mathematics and mechanical drawing and you no doubt found parts of these subjects tedious and dull and little to your liking, but you probably learned them well because they were necessary if you were to become any kind of engineer. Why, then, scorn learning the rudiments of language as being any less essential? It is not so difficult to learn that you need to be afraid of it, and it won't take any more time than you can afford.

It has been said that technical writing is a skill that can be taught. It can be; it has been; and it will continue to be taught—but not to everybody. Maybe you have made yourself unteachable by refusing to be interested in and concerned about these "petty details".

Suppose you were as careless and as uninterested in the "details" of mathematics. How much value would your calculations have? If you ignore the details of drafting, what value does your mechanical layout or electrical circuit diagram have? The fact that a really smart colleague can still figure out what you meant is hardly sufficient justification for slovenliness in mathematics or drawing—or in writing. Surely you would rather study a carefully sketched and labeled drawing or a clearly developed and accurately symbolized mathematical analysis than one that you have to reconstruct before you can begin to understand it.

If you think that "literature" is long hair nonsense—beneath your analytical, nonemotional, intellectual level—the best thing you can do is to form a liaison with a good technical editor. Make a fast friend of him, because you undoubtedly have to write various kinds of reports from time to time and he can make you look much better than you really are. You will save a lot of headaches for everybody if you will acquiesce in matters that you admit don't interest you and about which you know little.

The gist of all this is, "Get out of the rut." Stop committing linguistic incest by reading only "technical" writing and then imitating what you find in many a technical report, textbook, or magazine. Learn to recognize the language faults in the technical material you read and avoid them in your own writing. Acquire a broader language background by reading in other fields and being aware of the use of language while you read.—End.

Coming in the December Issue of AMERICAN ENGINEER . . .

—The Employee and Invention Rights—a Legal Appraisal

—Defining the Engineer and His Work

—City Planner and Highway Engineers—An Inseparable Team

About the Author . . .

Mr. Taylor

John M. Taylor, Jr., earned his B.S. in mathematics and chemistry at Randolph-Macon College in 1943. Following graduate study at the University of North Carolina, he joined the staff of the Naval Research Laboratory, Washington, D.C., as a project engineer in the Crystal Section of the Sound Division. Since 1947 he has been with the Navy Underwater Sound Reference Laboratory, Orlando, Florida, managing the laboratory's publication program, among his other duties. Co-author of *Design of Crystal Vibrating Systems*, he is a member of the Acoustical Society of America and the Panel of Abstractors for *Science Abstracts*.

CLARK A. DUNN, P.E.
Past NSPE President

A New Look at Membership Requirements

This article by a past president of NSPE is the first in a series which will discuss pros, cons, and various aspects of the newly proposed changes in the Society's membership requirements.

IF each member of NSPE is to vote wisely on the amendment to the constitution proposed by the Inter-Society Relations Committee, he requires a knowledge of the intent of the present membership requirements and an accurate understanding of the proposed changes.

It would seem to the writer that the founders of NSPE faced a most difficult task of formulating membership criteria that would be fair and equitable for every qualified engineer regardless of his field of specialization. Of probably equal importance in the selection of membership criteria was their potential impact on the recognition of engineers as professional men by the public and members of other professions. The implication of the acceptance of any group as professional is best expressed by Dr. Wickenden in the pamphlet "The Second Mile". Dr. Wickenden says:

> "The public grants to a profession more or less tangible monopolies and self-governing privileges, in consideration of which the profession engages to admit to its circle only men of proved competence, to guarantee their trustworthiness, to insist on the observance of ethical relations and practices, and to protect the public against bungling and extortion."

No doubt there was considerable thought given to many detailed criteria for membership by the founders of NSPE. It would seem logical to believe that two factors led to the adoption of registration as the simplest and most desirable criteria. First, anyone who became registered was legally recognized as a professional engineer. This legal status corresponded to the legal status obtained by members of the professions of law and medicine. Second, the existence of registration for professional engineers in over half the states and territories at that time had been accomplished by the cooperative efforts of engineers from all fields of endeavor. In later years, the promotion of more uniformity in registration laws through the formulation of a model law endorsed by 13 engineering societies would appear to make registration the most generally accepted criteria of the professional engineer.

In essence, NSPE founders accepted as their membership criteria the same criteria that over 250,000 engineers have now selected as the essential requirement for offering their services to the public.

Registration, having been promoted by engineers in so many categories of education and employment, thus represents the common bond between these diverse groups. It would seem desirable in each engineer's own best self-interest to identify himself through registration with the many other engineers who have acquired the legal right to be called *professional* engineers.

Registration was not only important to professional engineers, but it was vitally important to the public since it provided an identity of the qualified engineers available to serve the public. It was logical also for the professional engineers to band together in a society such as NSPE in order to discharge the moral obligations (expressed by Dr. Wickenden) of ethical conduct and trustworthy service.

It is obvious that in any free society some individuals will reject the views of the majority. It is therefore not surprising that every qualified engineer has not been willing to establish his legal qualifications by registering. The crux of the question facing the NSPE members as they consider voting on the amendment to our constitution is—"Shall we in any way change our primary membership criteria of registration?" The proposed amendment does not reject the long term importance of registration as a desirable criteria for the individual engineer and the public. It does recognize the fact that all qualified engineers do not choose to become registered as a means of identification as a professional engineer and therefore are not eligible for membership in NSPE.

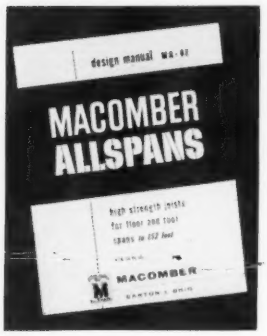
WHILE the writer has believed for many years that if engineering is to become a strong profession there must be a common bond such as registration for all technical engineering groups, it does, nevertheless, seem logical to provide membership opportunities in NSPE for those engineers who hold a grade of membership in the founder societies where future applicants must be registered to be eligible. In many respects this is an application of the principle of the "grandfather clause"—incorporated in registration laws—to the membership requirements of NSPE.

While the writer believes any criteria of membership devised by NSPE would be subject to more justified criticism than the criteria

(Continued on page 50)

New Literature

JOISTS – The Macomber Company has recently published a two-color, 36-page bulletin describing their complete line of high strength joists for floor and roof spans in sizes to 152 feet. Described and illustrated in the booklet are the Macomber plant facilities; dimensions and properties of their products; deflection calculations; uniform load tables, extended ends—tables, properties and types; bridging information; construction details; macaform slab centering; steel deck load table; and specifications. Cutaway diagrams, pictures and charts give the reader a complete view of each product available.

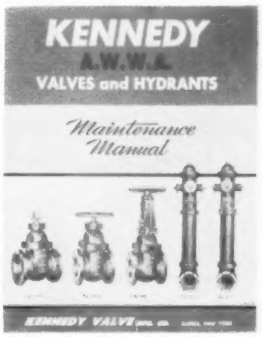


(Circle 15 in Readers' Service Dept.)

ROOF VENTILATOR—Complete details, specifications, dimensions and performance data on four types of propeller fan-powered roof ventilators are included in a new Bulletin, A-112E, issued by Hartzell Propeller Fan Company. Equipment covered in the catalog includes two vertical discharge units, the Vertijet and the Airjet, the new Hartzell Mushroom Head Roof Ventilator and the unique Hartzell Reversible Roof Ventilator which can be converted from exhaust to intake at the flick of a switch. Complete data on Hartzell penthouses, and stack caps is also included in this bulletin.

(Circle 17 in Readers' Service Dept.)

VALVES AND HYDRANTS – The Kennedy Valve Manufacturing Company has published a 32-page catalog and maintenance manual of their various products. Among the products listed are: the Kennedy AWWA gate valves; swing check valves; Kennedy AWWA hydrants; K-10 hydrant standard model; K-11 hydrant safetop model; hose couplings; templates; bell and spigot end dimensions; mechanical joint pipe dimensions. The booklet covers general specifications, methods of operation, special arrangements, as well as additional features. Cutaway diagrams, charts and illustrations are given of the various models of each type of valve.



(Circle 20 in Readers' Service Dept.)

GRINDING CONCRETE—Stow Manufacturing Company has just published a new four-page illustrated bulletin on the subject of "Grinding Concrete". This bulletin gives complete information on the proper accessories and speeds for both wet rubbing and dry grinding on various jobs. Information on the proper equipment for finishing hardened concrete walls is given as well as for finishing concrete floors and ceilings. There is also a section on grinding prestressed concrete beams.

(Circle 18 in Readers' Service Dept.)

TIME CONTROLS—Tork Time Controls, Inc., has published an eight-page, two-color bulletin describing their complete line of time controls which include 55 ampere, seven day, weekend skip, three pole, astronomic, momentary contact, and reserve power. Describing each one in detail and listing distinctive parts, the booklet shows detailed illustrations of each product. Operation instructions and diagrams show pertinent details.

(Circle 16 in Readers' Service Dept.)

MONOTUBE PILE – A comprehensive 24-page catalog covering Monotube fluted steel foundation piles was recently released by The Union Metal Manufacturing Company. In addition to complete descriptive information, the new catalog includes typical installation photos, test driving data, and other technical information of particular interest to engineers, contractors and architects. Union Metal's Monotube Pile Catalog is identified as Catalog No. 91.

(Circle 19 in Readers' Service Dept.)

WORK SCHEDULING – Simplified visual control and scheduling is the subject of a concise twelve page booklet just released by Memo Flex Division. The graphic presentation highlights the flexibility and ease of use as well as the advantages possible with this unique new visual control or scheduling board. The Memo Flex unit is particularly outstanding in that the user may lay-out or customize the control board to suit his particular needs.

(Circle 21 in Readers' Service Dept.)

COMPOSITE CONSTRUCTION – Gregory Industries, Incorporated has published a 12-page two-color booklet describing composite steel and concrete construction for buildings. Giving an explanation of what composite construction actually is, they give a brief history of the process and tell how it is used to advantage in buildings. Among the advantages they list for this type of construction are: more efficient use of steel; saves labor and structural materials; extra space; more effective design; longer spans; extra reserve strength proven in bridge design.

(Circle 22 in Readers' Service Dept.)

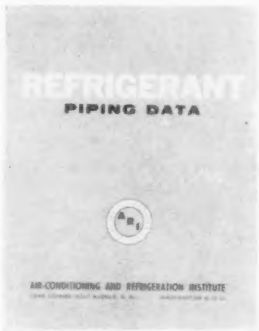
PRESTRESSED CONCRETE—Prestressed Concrete Institute has published a new 20-page booklet that describes 21 different types of structures in which prestressed concrete is frequently used, along with the primary reasons for its selection in each case. Illustrations include typical units. Tells how prestressed concrete is made, outlines applications and advantages and pinpoints the locations of PCI member plants. Written in nontechnical language, the booklet should be helpful to architects, engineers, contractors and their clients.

(Circle 23 in Readers' Service Dept.)

SPECIFICATIONS – The Williams Seals & Gasket Division of Williams Equipment & Supply Co., Inc., has introduced a new Suggested Master Specification which offers the architect and engineer a complete specification covering control joints in masonry construction, expansion joints in setting of cut stone, water stop used in concrete construction, panel seals used in precast or prefabricated panels, and sound deadener strips used under the metal locker section. This is a suggested master or checklist type specification which is intended as an aid in writing an accurate and complete specification in a minimum of time. It was compiled by a professional specification writer. Some of the long forms include specifications for control joints and gaskets, expansion gaskets and water stops. Some of the short forms available include panel seals and sound deadener strips.

(Circle 24 in Readers' Service Dept.)

REFRIGERANT PIPING DATA – A 62-page book designed to serve as a guide for the proper sizing of refrigerant piping for the common types of refrigerants has been published by the Air-Conditioning and Refrigeration Institute. In presenting the data included in the book, which includes data for Refrigerant 12 (dichlorodifluoromethane), Refrigerant 22 (monochlorodifluoromethane) and Refrigerant 717 (ammonia), ARI points out that "since each job has its own problems and peculiarities, and must be individually designed, this booklet should be used primarily as a guide." Information presented includes tabular and chart data not available elsewhere, supplements the ready-reference information with discussions, with suitable references, of the basis for refrigerant piping design including instructions, with worked-out examples for application of the tables and charts.



(Circle 25 in Readers' Service Dept.)

PILE DRIVING—C. L. Guild Construction Company, Inc., has published an eight-page brochure entitled "The Caudill Drive-Point Pile" which includes a completely illustrated description of this new pile with a patented boot that allows the mandrel to lock the boot to the steel shell. The shell is pulled into the ground by the driving action of the mandrel into the boot. This brochure includes illustrated field load tests of the Caudill Drive-Point Pile and a table giving the data on the size and structural strength of the Caudill Drive-Point Pile. The brochure also includes suggested specifications.

(Circle 26 in Readers' Service Dept.)

METAL HOSE – The new 4-page technical bulletin (No. 26) of Atlantic Metal Hose Co., describes stock flexible metal hose connectors engineered to meet the common vibration, expansion and misalignment conditions encountered in the plumbing and heating field. In addition to features and applications, Bulletin No. 26 has a section on stock fittings, charts showing specifications and working pressure correction factors and a detailed section on proper installation and use. Atlantic Metal Hose Company manufactures a complete range of flexible metal hose products for every industry.

(Circle 27 in Readers' Service Dept.)

FEDERAL SPECIFICATION—Southern Pipe has published a 16-page Technical Bulletin 100 covering Federal Specification INT. FS-SS-P-00385. For the first time cement mortar lined and reinforced cement mortar coated steel pipe has a Federal Specification with Southern Pipe Steelcor Cemcote, the first such pipe designed to this Federal Specification which covers cement mortar lined and reinforced cement mortar coated welded steel pressure pipe from four to 42 inches in diameter for use in water transmission, distribution and feeder pipelines. The new technical bulletin also contains design tables for water pressure classes 100, 150, 200, 250, 300, 350, and 400, as well as a friction loss table for pipe diameters (waterways) from four to 48 inches and flows from 10 to 100,000 GPM. A special section explains Southern Pipe's exclusive Pres-Seal joint and provides a deflection angle chart and graph for allowable radii of curvature for various pipe lengths.

(Circle 28 in Readers' Service Dept.)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in these columns, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

EW Promotional Kits Sent to State and Local Chapters

Promotional kits for the 1962 National Engineers' Week, February 18-24, have been sent from NSPE headquarters to National Society affiliates throughout the country at the state and local chapter levels.

The kits contain sample posters, banners, gummed seals, bumper stickers, and other aids available for the 1962 observance, along with material outlining a suggested basic Engineers' Week program in terms of speakers, newspaper publicity, exhibits, and radio and TV. The kits also contain a number of special newspaper sections obtained by local chapters during the 1961 Week, and an extensive report on the 1961 observance from the Chicago Chapter. The latter is included as an "idea source" for local Engineers' Week committee chairmen who are interested in developing a comprehensive community program.

This promotional material is enclosed in a plastic, zippered brief case. The case, on which the PE emblem is printed, may be used throughout the year for other professional society committee work.

The theme for the 1962 Week is "Economic Growth Through Professional Engineering." A series of Bulletins on the Week will be mailed from NSPE headquarters. These will offer suggestions for building local projects around the general theme of the observance.

The order form printed in this issue of the AMERICAN ENGINEER lists the promotional aids available for the Week. Orders for material should be placed well in advance of the February date. All orders for the Pitney-Bowes postage meter ad plates must be received by December 15.

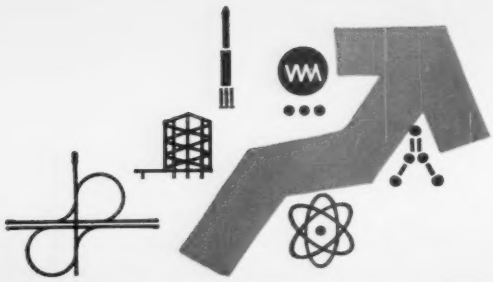
The 1962 Engineers' Week will be the 12th under the sponsorship of NSPE. Thirteen leading engineering figures will act as individual sponsors. National chairman for the 1962 event is Warren C. Stadden, a consulting engineer and architect of Roselle, N.J.

Efforts will be made to have a joint resolution introduced in the Senate designating the week of George Washington's birthday each year as National Engineers' Week. The President of the United States will also be asked for a communication to the engineering profession. Reproductions of the President's message, when available, may be ordered from the National Society.

Promotional Kits and Promoters

Major General A. M. Minton, director of civil engineering, USAF, will be the "announcer" for one of the 20-second spot films offered for TV use during the 1962 National Engineers' Week.

Former NSPE President Garvin Dyer, left, receives a 1962 National Engineers' Week promotional kit from Harvey Pierce, NSPE Southeastern Area vice president, at the NSPE fall meeting in Roanoke, Virginia.



PROMOTIONAL AIDS FOR NATIONAL ENGINEERS' WEEK

Here are the basic promotional aids on which to build your Engineers' Week program. These items will give your program coverage in local newspapers, on radio and TV stations, and in civic and group displays. Use these promotional materials to emphasize engineering and economic growth.

1 **TV Spot Films:** A set of five 20-second TV films dramatizing the theme of the 1962 National Engineers' Week. Produced to meet network standards, the films call attention to the contributions of engineering to our national economic growth. Each film qualified for public service TV time during station breaks. A set of these five films will reach your largest Engineers' Week audience. Price: Set of five films, $25.

2 **Set of Seven TV Slides:** Obtain extensive TV coverage through the Week with these slides displaying poster-type art work and printed copy calling attention to engineering. May be used during all TV station breaks as public service announcements. Price: $10 per set of seven slides.

3 **Tape Recorded Radio Announcements:** A set of seven 20-second radio spot announcements, made by a network radio and TV announcer. Offers local station a top-level recording for 20-second station breaks. Price: Set of seven recorded announcements, $3.50.

4 **Postage Meter Plate:** Pitney-Bowes postage meter ad plate which imprints National Engineers' Week and the theme on first class mailings. Two meter model sizes: R (regular), and DM (desk model). Prices: Model R plate, $15; Model DM plate, $10.

5 **Posters:** Colorful 9x11-inch pasteboard posters carrying the 1962 Engineers' Week design and theme. This is the basic promotional item for calling attention to the Week. Use on bulletin boards, in window displays, school exhibits, etc. Large size (18x22 inches) also available. Prices: 9x11, $4 per 100; 18x22, $5 per 100.

6 **Paper Banners:** Excellent for display use. Three feet long by 6 inches wide. Has poster design and words "National Engineers' Week" in color. Price: $4 per 100.

7 **Bumper Stickers:** Gummed paper stickers, 15x3¾-inch carrying the words National Engineers' Week and a reproduction of the professional engineer's seal, in bright yellow on a black background. Prices: 100 to 500—15¢ each; 500 to 1,000—10¢; 1,000 to 3,000—7¢; 3,000 to 5,000—5¢; and over 5,000—4¢.

8 **National Engineers' Week Seals:** Use these brightly colored seals on all office mail from now through February 24. Poster design printed on 1½-inch gummed paper. Price: $3 per 1,000.

9 **Newspaper mat story on how engineering contributes to national economic growth:** A feature article describing how engineering knowledge and skill becomes the basis for increased job opportunity. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 75¢ each.

10 **Newspaper mat story on outstanding engineering accomplishments of the 20th Century:** A feature article listing and describing some of the engineering achievements which have brought us into the new era of rapidly expanding technology. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 75¢ each.

11 **Newspaper mat story on engineering and science:** A feature article explaining the chief differences between basic science and engineering. Prepared on mat, with illustration, ready for immediate insertion in daily or weekly newspaper. Price: 75¢ each.

12 **Logotype:** A metal cut of a poster design to insert in advertising, special sections of newspapers, industrial house organs, magazines, and other printed matter. All state society and chapter publications should have one. Price: $1 each.

USE THIS COUPON TO ORDER YOUR AIDS NOW!

1.....TV spot films @ $25 per set.
2.....TV slides: set of 7 slides @ $10 per set.
3.....Recorded spot announcement @ $3.50 per set.
4.....Postage meter plates: Model R @ $15 ea.; Model DM @ $10 ea.
5.....Posters: regular size @ $4 per 100.
Posters: large size @ $5 per 100.
6.....Banners @ $4 per 100.
7.....Bumper stickers: 100–500 @ 15¢ ea.; 500–1,000 @ 10¢ ea.; 1,000–3,000 @ 7¢ ea.; 3,000–5,000 @ 5¢ ea.; over 5,000 @ 4¢ ea.
8.....Seals @ $3 per 1,000
9.....Logotypes @ $1 ea.
10.....Newspaper mat stories on engineering and economic growth @ 75¢ ea.
11.....Newspaper mat stories on outstanding engineering accomplishments @ 75¢ ea.
12.....Newspaper mat stories on engineering and science @ 75¢ ea.

National Society of Professional Engineers
2029 K Street, N. W., Washington 6, D. C.

Sirs:

Please rush me items indicated. I enclose a check ☐ money order ☐ in the amount of $..... I understand remittance must accompany order.

NAME.....
(please print)

ADDRESS.....

CITY.....STATE.....

Board Gives Approval to New Membership Plan

Board approval of a proposal to broaden the NSPE membership base to provide representation in the National Society for certain nonregistered engineers, and the premiere showing of the new NSPE film "George Spelvin, P.E." were the highlights of the National Society's Fall Meeting in Roanoke, Virginia.

The Board of Directors without dissent gave approval to a three-point recommendation by the Inter-Society Relations Committee which:

(1) Approved a unified statement of principle by AIEE, ASME, and NSPE concerning the functional unity concept of the engineering profession.

(2) Authorized the Inter-Society Relations Committee to continue joint activities with other engineering groups to improve the organization of the profession.

(3) Authorized the submitting of proposed changes in the NSPE Constitution and Bylaws to a vote by the Society membership which would establish three classifications of Society members.

The three classes in the latter proposal would be: Professional Engineer Member, Member, and Junior Member. The "Member" classification would permit NSPE membership for engineers who are not registered but who, as of date of approval, are members of an approved national engineering society in a grade of membership to which only P.E.'s will be admitted in the future. Individuals in the "Member" classification would have all the rights and privileges of Professional Engineer Members except that of holding office in the National Society.

Inter-Society Relations Committee Chairman Garvin H. Dyer told the Board that "the real purpose of the whole functional concept is to get our profession unified." The former NSPE president spoke at length on behalf of the three-point recommendation and urged the Board to consider that "the entire profession is watching what we do about unity."

Emphasizing that concurrent membership in technical and professional societies is a basic part of the functional plan, Mr. Dyer stated that "we need to get these men who are not registered in here with us. We must get to understand their problems and show them the advantages of registration."

The Board also heard a representative of ASME report that the Executive Committee of the ASME Council had approved the unified statement of principle.

The October 18-21 meeting of the National Society was held jointly in the mountain-ringed city with the Virginia Section of the American Institute of Architects, and the Virginia Society of Professional Engineers.

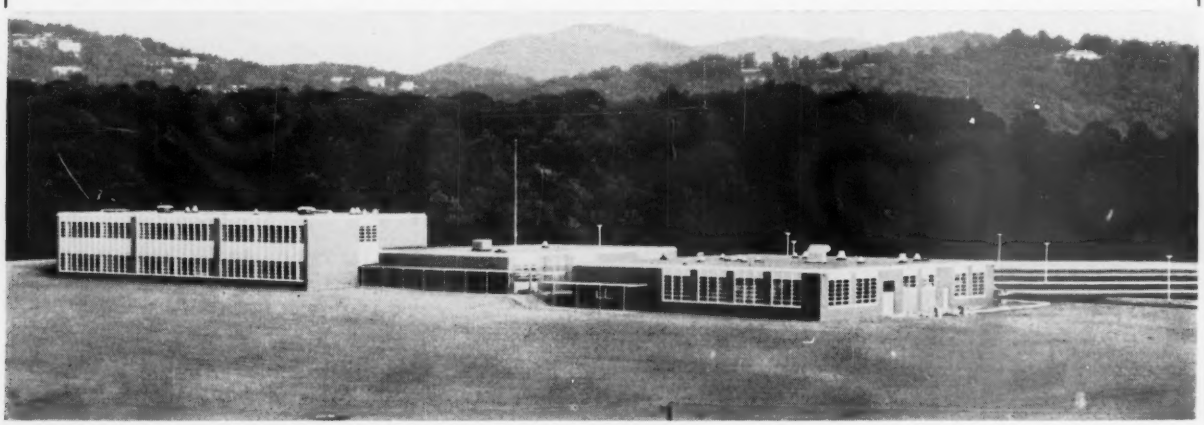
NSPE Board members and guests viewed the first public showing of the newly completed National Society film during a regular session of the professional meeting. The audience of several hundred saw a 22½-minute filmed presentation in color, of a young engineer working in his technical specialty and developing the concepts of professionalism. The film was introduced by Kenneth E. Trombley, NSPE director of public relations, who described the project as "an effort to reach engineering school students and recently graduated engineers with a graphic, yet realistic, portrayal of the various factors which are involved in building for professional growth."

The promotional program for distributing the film to the engineering schools was explained to the Board by Phillip M. Kimmell, chairman of the Public Relations Committee.

NSPE President Murray A. Wilson in a "State of the Society" address suggested that each chapter

Roanoke Technical Institute

The newly completed Roanoke Technical Institute, dedicated in ceremonies during the NSPE Fall Meeting in Roanoke. The Institute will offer college level courses in a two-year program for engineering technicians.



Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.
NSPE Executive Director

Definition of an Engineer

For many years the engineering profession and others who deal with engineers have been wrestling with a definition of engineering that would be widely accepted. Many definitions have been written but it appears that each has for some reason lacked acceptance.

It would appear from current discussions that there are at least three areas for which an adequate definition is needed:

1—For legal purposes. The first facet of this problem is in connection with registration laws whose terms must be sufficiently clear that there can be no legal doubt as to whom is intended. The high degree of uniformity of this definition within our registration laws would indicate its success. The second is in connection with wage-hour and labor laws; here again the definition of the administrator of the Wage-Hour Act and that contained in the Taft-Hartley legislation appear to meet this requirement.

2—A dictionary definition for common usage. There are many who will argue that the legal definitions referred to in (1) are sufficient for this purpose, but there continues to be a lack of acceptance of these definitions by many concerned with a delineation of the engineering profession. At the recent meeting of ECPD the Committee on Recognition recommended a definition as follows: "Engineering is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize economically materials and forces of nature." The Committee then supplemented this definition with seven explanatory notes pertaining to various words used in the definition. This was the subject of considerable discussion at the ECPD meeting, and while the Council approved the recommendation of the Committee, the extent to which this definition will be accepted remains to be seen.

3—A simple definition to distinguish engineering from science. There is much concern that technical developments almost exclusively engineering in nature are rarely identified as such. This failure is deemed by many as being a major factor in the declining engineering enrollments of the past several years. An NSPE committee concerned with this problem suggested to the Society at the Seattle meeting that a simple definition distinguishing between engineers and scientists would do much to alleviate this problem. The following definitions were recommended and approved by NSPE: Engineers are primarily creators of things and services useful to man; scientists are primarily discoverers and interpreters of information about nature.

It may be that our complex world needs all three of these definitions. Certainly if the Nation is to attract the kind of brainpower needed for adequate engineering work, a better public understanding of the profession is needed. It is encumbent upon the members of the profession not only to explain what they do and their contribution to the welfare of the people of our Nation, but to be equipped so that their explanations can be understood. It would be well for each engineer to be familiar with these definitions in order that he may use an appropriate one depending upon the circumstances in which he finds need for it.—**End**

should attempt to seek out its ex-members and find out why they are no longer members.

"Some, and I fear too many, of our chapters are not providing the stimulus for professional growth which we owe to all members, new and old," Mr. Wilson said. The president commended those state societies which have expelled members for ethical violations. "No group of men," he said, "is justified in calling themselves professional unless and until they can police their own ranks and enforce their adopted code."

In a joint luncheon for architects and engineers, Dr. John W. Shirley, dean of the faculty at North Carolina State College, told his audience that the conservatism of educational people has led to a serious time lag in getting the new knowledge into education. "Many of our departments of science," he said, "are actually departments of science history." Dr. Shirley described the basic problem of education in engineering and in architecture as revolving around the two issues of coping with the sheer bulk of the new knowledge, and getting the best of the new knowledge into the curriculum.

The mutual relationships of architecture and engineering were explored in a panel discussion by educators and practitioners in both fields. Harlan E. McClure, dean of the school of Architecture at Clemson College, charged that the architect, as a professional, too often "has a lack of understanding of allied professionals."

The engineer educator on the panel, Loyal V. Bewley, dean of the College of Engineering at Lehigh University, declared that "never before has engineering education been in such a state of upheaval." He criticized efforts to give the prospective engineer nothing but science in his four-year schooling, and suggested that engineering school departments be abolished in favor of combined course programs in such areas as materials, design, heat and fluids, electronics, and highways and sanitation.

Edward J. Benesch, vice president of the consulting engineering

(*Continued on page* 48)

GEORGE SPELVIN, P.E.*

A young engineer is designing a fuel handling memory and control system. The film goes back into his life to illustrate the things which have brought him to professional status—ethics, graduate education, the EIT examination, participation in civic affairs, registration, public speaking and the importance of personal broadening in fields outside the technical area of specialized engineering work. □□ Inquiries concerning reservations for this film, offered at no charge, are invited from engineering school deans, and professional societies. The National Society of Professional Engineers, 2029 K Street, N. W., Washington 6, D. C. □□□□□□□

***A 23-minute color film sponsored by the National Society of Professional Engineers for showing to engineering students and recent engineering graduates.**

(*Continued from page* 46)

firm of Syska & Hennessy, said engineer cooperation "should begin at the six-b pencil stage and continue on through any project." Panelist Vincent G. Kling, an architect in private practice, suggested that the lack of cooperation between architects and engineers is "due essentially to the engineer's lack of a feeling for the over-all environment" which the architect must consider in his design approach.

Reports from the Functional Sections for engineers in government and private practice were made to the Board at the Roanoke meeting, along with reports from a number of committees covering a broad area of National Society interest.

In a discussion devoted to recommendations by the Section, the Board heard reports of direct economic pressure on engineers to force them to join unions as a result of the executive order issued by the Mayor of New York City concerning collective bargaining for all city employees.

Approved at the Roanoke meeting were a set of rules of procedures and operations of the newly established Professional Engineers in Industry, a functional section of the National Society. Acting on an Engineers in Industry recommendation, the Board voted to approve NSPE endorsement of legislation now pending before Congress to provide that moving expenses paid by an employer for a newly-hired employee shall not be considered as taxable income to the employee.—**End**

Top—The National Society's Functional Section for Engineers in Government Practice in session at the Roanoke meeting. Center—A "Working shirt sleeve" session of the Functional Section for Consulting Engineers in Private Practice. Bottom—Seven NSPE Executive Committee members open a discussion before the regular meeting of the full Board.

NSPE President Murray A. Wilson calls for a vote of Board members.

Opening of the NSPE Board meeting in the Shenandoah Room in the Hotel Roanoke, Roanoke, Virginia. Mayor Willis M. Anderson, mayor of that city opens the program.

C. K. Whitescaver, Jr., Roanoke consultant and state convention chairman for the Virginia SPE, looks over an exhibit at the joint NSPE-VSPE-AIA Virginia Section meeting. Explaining an air conditioning display is W. P. Mounfield, Roanoke architect, state convention chairman for the Virginia Section of the AIA.

to Remember

North Dakota Society of Professional Engineers—Annual Meeting, November 3, Bismarck, North Dakota.

Maine Society of Professional Engineers—Annual Meeting, November 4, Augusta, Maine.

Professional Engineers of Oregon—Annual Meeting, November 10-11, Benson Hotel, Portland, Oregon.

Arkansas Society of Professional Engineers—Annual Meeting, December 8, Marion Hotel, Little Rock, Arkansas.

South Dakota Society of Professional Engineers—Annual Meeting, November 30-December 2, Sheraton-Johnson Hotel, Rapid City, South Dakota.

National Society of Professional Engineers—Winter Meeting, January 25-27, 1962 King Edward Hotel, Jackson, Mississippi.

By Mrs. Clark A. Dunn, Chairman Ladies Auxiliary Advisory Committee.

Auxiliaries to professional engineering societies are coming to life all over the country after a summer recess which usually included only family picnics and social gatherings. Reports of many interesting programs for the coming year are beginning to come in.

Engineers' Wives, the Auxiliary to the St. Louis Chapter of the Missouri Society of Professional Engineers, began their activities for the year with a brunch for new and

(Continued on page 50)

CLASSIFIED ADVERTISING

Minimum 3 lines.
Undisplayed, $1.80 per line. Three or more consecutive insertions $1.50 per line each.
Displayed: Same rate as General Advertising.
Positions Wanted: Undisplayed, 90¢ per line. Three or more consecutive insertions 75¢ per line each. Displayed: General Advertising rates, less 50%.
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Positions Available

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LARGE, WASHINGTON, D. C., ASSOCIATION desires to add to staff, PE or EIT with creative ability in the writing field, with initiative in promoting ideas, with ability for organizing and programming and as a contact man at regional and local levels. Age level: 25-35. Send resume including education, experience and salary desired. Box 1003, AMERICAN ENGINEER.

"NER" describes hundreds of $7,000-$35,000 Executive job openings monthly. Write for free copy. National Employment Reports, 105 W. Adams, 830-R, Chicago 3.

PERMANENT OPENINGS FOR RESIDENT ENGINEERS experienced in supervision of construction of high voltage transmission lines. Degree and registration desirable. Excellent opportunity with consulting engineering firm. Please send resume of education, experience and salary requirements to Box 1102, AMERICAN ENGINEER.

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MECHANICAL ENGINEER, P. E., fourteen years experience plant engineering, refrigeration, warehousing, food processing, material handling, cost control. Desire position as plant engineer or traveling engineer. Prefer Great Lakes area. Write Box 1104 AMERICAN ENGINEER.

TEXTILE ENGINEER & CONSULTANT offers broad experience in manufacturing and engineering, process layout, modernization of existing plants, new plant design, feasibility studies, site location, appraisals, etc. with large A/E firm. Desires more challenging association with established A/E firm, preferably in southeast. Will consider connection with large textile mill group or association with management group or other engineers for private practice. Box 1101, AMERICAN ENGINEER.

Professional Services

INVENTION DEVELOPMENT. Industrial research. Patents. Details on request. Todd Consulting Engineers, 424 West 119th St., New York 27. UN 5-3435

Miscellaneous

JOB HUNTING? MAILING RESUMES? SALES LEADS? INVEST $1.00 for any of the following:
1. Mailing address Directory of over 500 R&D Engin. & Manuf. Firms located at these Industrial Centers: Route 128 & 3, Needham, Waltham, Natick, Cambridge, Burlington, Newton & Boston.
2. Instructions on "Aids to Better Employment and Interview Behavior and procedures."
3. Sample Resume including "Write it yourself aids."

KENMORE VOCATIONAL PUBLICATIONS
520 Comm. Ave. Boston 15, Mass.

AUXILIARIES

(Continued from page 49)

prospective members held at the Engineers' Club of St. Louis. Mrs. Howard Honefenger is this Auxiliary's newly elected president. She served the past year as area chairman for the Central Area of the Ladies Auxiliary Advisory Committee of NSPE.

The "Program Forecast for 1961-62" of the Auxiliary to the Professional Engineers of Oregon includes such interesting subjects as world affairs, art appreciation, home appreciation, a fashion show and a Mr. and Mrs. potluck supper party. The Oregon State Auxiliary provides a full tuition scholarship for an engineering student in his junior year at Oregon State University. Money for this scholarship is raised from proceeds from the fall tea and the spring fashion show. This group will be helping their husbands host the State Convention in Portland in November.

The Connecticut State Auxiliary has given a scholarship to an engineering student every year since 1954. All three chapter auxiliaries in the State contribute toward this annual scholarship. They are assessed according to their membership. The manner in which they raise their quota is left entirely up to each group.

The projects which engineering auxiliaries have in secondary schools should not be over-looked or under-estimated. It is at this level that many young people decide on an engineering career. There is undoubtedly much of this type of project about which we never hear and we would like to, as they are just as important as the impressive university scholarships which the larger auxiliaries give. Many slide rules, text books and other engineering equipment are given to high schools over the Nation.

During Engineers' Week the Connecticut State Auxiliary places speakers in secondary schools to talk on the subject of engineering as a career.

In New York State, one auxiliary set up an engineering display in the public library which aroused so much interest among young people that it was later moved to the high school.—**End.**

LEGAL NOTICE

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946, (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

American Engineer, published monthly at Washington, D.C.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, National Society of Professional Engineers, 2029 K St. N.W., Washington, D.C.; Editor, Kenneth E. Trombley; Managing Editor, Patricia E. Stivers; Business Manager, Fleet Haselden.

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3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 60,000 each issue.

KENNETH E. TROMBLEY, Editor

Sworn to and subscribed before me this 13th day of September, 1961.

(SEAL) MILTON LUNCH

(My commission expires September 14, 1962.)

DUNN

(Continued from page 40)

—registration—he also believes that the membership should take favorable action on the proposed amendment. This amendment does not reject the basic policy of NSPE which recognizes registration as important to the public and the individual engineer, but it also recognizes registration as an obstacle to their affiliation with NSPE in the minds of a few qualified engineers. While in many instances processes of registration for these individuals would not be difficult, why should NSPE be unwilling to make a concession that will not imply any lessening of the importance of registration as a factor in engineers acquiring the status of professional people?—**End.**

LARSEN

(Continued from page 35)

THREE pieces of literature were used by the "decertifiers" in their campaign: (1) The Kohler Story

(the "Red Weapon") was distributed in one mailing, (we obtained the copies directly from the Kohler Company), and the Federation contends that this was one of the main things that beat them. I don't believe this, because I personally distributed all of the copies I could obtain of (2) the Kohler Workers' Story. These came from the UAW. To an engineer, the message was the same from both sources, e.g. "What a helluva mess." (3) The Constitution and Bylaws of the UAW was an effective weapon. Few engineers relished the idea of a "ladies auxiliary" or the requirement that a convention delegate wear at least one item of union-made clothing.

The letters that were sent by everyone, I described as excessive. But were they effective? Did they sway the election? Except for the things I have pointed out (flaws, literature), I believe the effect of all the letters was, at the most, minor. I believe further the main things deciding the election were (and in this order): (1) The presence of a substantial number of engineers who openly opposed the union, influencing others by their conversation and presence; (2) the absence of conditions that led to the formation of the Federation, and therefore the lack of conviction that such a drastic move as affiliation with UAW was necessary; (3) the union investigations by the Congress plus the Kohler strike situation certainly made the union less attractive; and (4) the dinner given by the company on the eve of the election, which was followed by a pledge of good faith from top company management.

I believe we could have won the engineers without number (4). The margin would have been smaller, however. It is unfortunate, in a way, that we were unable to obtain a clear cut decision without the vote of the "wishy-washy" who were influenced by the good cheer of the dinner.

Honeywell got into the engineers' union situation because of a mixture of the Wagner Act, excess engineers, and supervisors who were technically skilled, but grossly inept in human relations. To prevent a return to collective bargaining demands action both

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by the engineers and the company. Top management must keep their house in order, particularly with regard to the above mentioned type of supervisors. The engineers must be alert and must establish horizontal and vertical communications. More than this, they must develop a professional approach —take a page from the book of the Honeywell Engineers Club. And that is another and a happier story. **—End.**

BER

(Continued from page 31)

be made aware of as a basis for their judgment. The quoted advertisement is couched in usual political tones and in the main stresses the opinion that the individual's engineering qualification is a relevant factor in his selection for the office.

Question 2. The use of his PE seal in the advertisement, however, raises other and more difficult questions. While the display of the seal may have been intended only as graphic portrayal of his engineering qualification, as referred to in the text, it is, in fact, more than that. The seal is an official mark authorized by the state for the express purpose of impressing it upon engineering drawings, specifications, plans and reports prepared by the professional engineer. Its use beyond that purpose converts it into a promotional device in a way not contemplated or authorized by the legislature. Also NSPE Professional Policy No. 61 recognizes the limited use of the engineers' seal.

Accordingly, we hold that it is inappropriate for a professional engineer to use his seal in any way other than on engineering documents. Such extraneous use of the seal is likely to discredit and do injury to the dignity and honor of the profession and cheapen the respect and value accorded it as evidence of engineering competence, converting it into a promotional tool of self-aggrandizement.

Conclusions:

Question 1. The text, as a political advertisement, is not unethical.*

Question 2. This use of the seal is inappropriate.

Board of Ethical Review
PHIL T. ELLIOTT, P. E.
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Chairman

Dissenting Opinion:

*We agree with the other members on the conclusion to Question 2.

On Question 1, we believe that the same standard of ethics applicable to professional engineering as enunciated in Case 59-1 (AMERICAN ENGINEER, April, 1960) should be applied to a political advertisement by a professional engineer.

MARVIN C. NICHOLS, P. E.
L. R. DURKEE, P. E.

TESTIMONY

(Continued from page 19)

(C) Because of the unique position of professional employees, we believe that professional associations are better equipped and are in a position to be more responsive to the needs of the members of the respective professions than are organizations composed of heterogeneous groupings of both professional and nonprofessional personnel. Thus, we are of the opinion that a certain degree of flexibility is required in the proposed employee-management policy to assure professional associations the right to approach Federal officials at all levels in order to discuss any pertinent matters of mutual interest.

However, should the Task Force recommend a concept which contemplates authorizing an organization to represent all employees in a given unit, then we suggest that such representative status be determined by a secret ballot election in which all employees affected would be given an opportunity to express their wishes, rather than by a system which does not guarantee the same degree of freedom of choice. We would view with disfavor, for example, a procedure wherein an organization could be deemed exclusive representative for all employees in a unit merely by obtaining a required number of signed authorization cards. We feel certain that the overwhelming majority of professional engineers in Government would strongly resent being represented by an organization solely on the basis of that organization's having received a required number of authorization cards when such cards are signed primarily by nonprofessional employees in the agency, division, branch or section in which the engineers are also employed.

Carrying this procedure a step further, we believe that even if a secret ballot

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election is required to select an exclusive representative, professional-level employees should be given a separate choice apart from nonprofessionals to determine their wishes regarding representation. As you know, professional employees are accorded such a self-determination right under Section 9(b)(1) of the Taft-Hartley Act. Although we fully realize the inapplicability of Taft-Hartley to Government employees, the philosophy behind the so-called "professional provisions" of that Act is pertinent to the current considerations.

The legislative history of the Taft-Hartley Act is replete with many instances of declarations of Congressional intent that the language of Section 9(b)(1) is designed to protect professional employees from being engulfed by a more numerous group of nonprofessional employees. We submit that the same considerations should be followed in the proposed policy governing Federal employee-management relations, and that adequate recognition should be given to the special needs and characteristics of professional employees.

(D) Professional employees, by the very nature of their education, experience, type of work and general background, have interests and needs which set them apart from employees who are not professional. This is recognized explicitly by Congress in the Taft-Hartley Act and the Federal Wage and Hour Act, and administratively through the interpretation and application of the Davis-Bacon Act and the Walsh-Healey Public Contracts Act. The distinction is recognized in the personnel policies of many industrial organizations as well as state and local government agencies.

Professional employees, as members of a learned profession, have goals, objectives and problems common to other members of that profession. This is true regardless of the field or circumstances in which they carry out their professional activities. Among professional employees in Government, there is a further similarity of interests and problems, irrespective of the department, agency, bureau or division where they may be employed. Therefore, we suggest that the proposed policy acknowledge this fact, and speak in terms of professional employees having the right to express their views and opinions through their professional association.

It is necessary then, that professional associations have an opportunity to approach Federal officials as circumstances warrant in order to discuss professional personnel problems wherever they may exist, be it at the department level, the bureau level, the division level, or even on a Government-wide basis, if necessary.

(E) The question of whether and to what extent Government space or time is permitted for meetings of employee organizations is, in our opinion, a matter which should be left to the discretion of appropriate Federal officials. It would be difficult to establish a definite rule, other than in the most general terms, which could be applicable at all levels of Government, both in Washington, D. C., and

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in the field, and to all types of employee organizations.

We do believe, however, that provision should be made for representatives of professional associations and other employee organizations to meet with Federal officials during working hours, under such reasonable limitations as may be required.

(F) Matters which employee organizations may logically wish to have included within the scope of dealings with Federal officials could conceivably run the entire gamut of employee-management relations. We believe, however, that some subjects, such as compensation schedules, leave policies and retirement and benefit plans, should be excluded, and left solely to the power of Congress. However, agency actions interpreting or implementing Congressional enactments on these points may properly be the subject of discussion. Permissible areas of dealing should be clearly set forth in the proposed policy and should be restricted to those subjects which are considered to be within the discretionary authority of Federal officials.

(G) We believe, as we have said before, that all employee organizations should have an opportunity to approach Federal officials to discuss various types of personnel problems and policies. Federal officials should be receptive to the views of employee organizations and should give them due weight and consideration, but should be perfectly free to accept or reject such views. In the event of any disagreement, Federal officials should have the final decision, and the full and complete authority to exercise their best judgment.

(H) We are opposed to recording areas of understanding between employee organizations and Federal officials along the lines of a formal agreement or contract. We do believe, however, that it might be advisable for future reference if the parties would utilize memoranda and/or an exchange of correspondence in order to confirm their understandings. The actual means to be used should depend upon the circumstances.

(I) In commenting on items C and D above, we have emphasized that professional employees have interests and problems different from nonprofessional employees. Consequently, we believe that the proposed policy should recognize this distinction and afford professional employees an opportunity to express their views through their professional associations, and to reject representation by

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organizations which include nonprofessionals among their membership.

We would mention for the record that professional associations include members who are both employees and managers and that no distinction is made between those who are supervisory and those who are nonsupervisory. This is essential to the concept of professionalism, for a profession must be ONE profession, and not divided into a management segment and an employee segment.

(J) We are firmly of the opinion, without qualification or exception, that the public interest and welfare must be paramount in developing an official policy for employee-management relations in the Federal service. No group or organization must be permitted to exercise its will or opinion in such a manner as to jeopardize the over-all mission of the agency or the concept of service to the public which characterizes our Federal system.

In addition to the rules and regulations applicable to all Federal employees, professional employees are guided as well by canons of ethics and rules of professional conduct which have been developed by the profession itself as a means of assuring compliance with the highest standards and ideals of a professional calling. With particular reference to professional engineers, we would call to your attention the following excerpt from the Engineers' Creed: "I pledge—To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations."

We appreciate this opportunity to present the views of the National Society of Professional Engineers and trust that we have offered some comments worthy of your consideration. Please be assured that we stand ready to assist the Task Force in any manner possible.—**End**

LETTERS

(Continued from page 4)

Society numbers only one registered engineer out of five around the country. You have convinced yourselves that a P.E. is tops, but you have not convinced employers.

(4) The "Missouri Engineer" has had a number of articles on "Integration of the Engineering Profession." Put more bluntly, a registered engineer would be required *by law* to belong to the Society, with loss of registration the penalty for dropping his membership in the Society. This is a cowardly way of making the law force membership on engineers and, in my opinion, would spell the end of your organization. Although I am assured by sincere and honorable friends who are Society members that this will never come to pass, I am shocked almost beyond words that space in an official publication would be given to such totalitarian ideas.

(5) Your magazine pictures the professional engineer as a man placed on a lofty pedestal (presumably by the Lord, with an assist by the State Board of Registration and the Society). He dispenses information to lesser men (at the recommended rate per diem) with a condescending smile and *never* sullies himself by entering into coarse competition. This mythical paragon is, of course, for God, Family, and the Flag, and can always be called on to serve his community—provided the press is present.

My idea of an engineer—registered or not—is an individual who works at his business honestly, giving his client or employer the best that he can give. Can one ask for more?

JOHN H. CARTER, JR., P.E.
Webster Groves, Mo.

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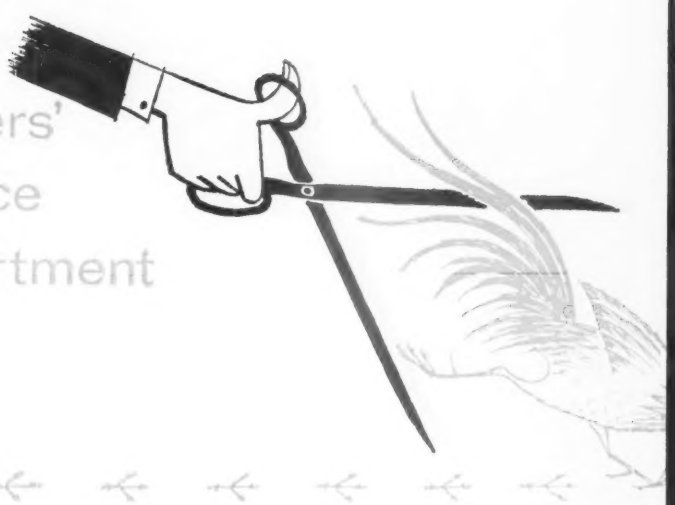

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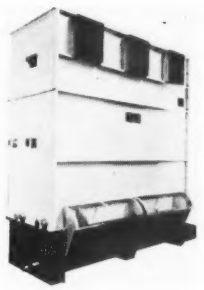
Progress in Products

NO-FROST UNITS — Item 30

Niagara Blower Company has announced the development of compact, "No-Frost" refrigerating units especially adapted to use in automatic, continuous production, chilled-air quick freezing of food products and prepared food specialties. Coils for direct expansion of the refrigerant gas are mounted within a casing designed for correct air movement. "No-Frost" spray nozzles distribute a spray pattern that prevents formation of ice or frost.



TIARA FIXTURE — Item 31

The new "Tiara" fixture being introduced by Dav-Brite Lighting, Inc., uses two-pyramid-shaped lenses and is only 3 3/16 inches at its thickest point. It measures 25 x 50 inches and uses four 4-foot fluorescent lamps. The Tiara's lenses direct a small component of light upward so that a floating effect is achieved, and the larger component downward to the work area. The fixture can be installed singly or in multiples to achieve any lighting pattern.

CONVEYOR — Item 32

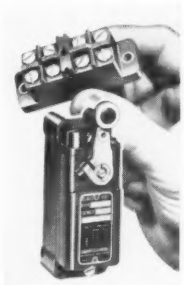
Columbus McKinnon Corporation has introduced a new CM Power-Flex power and free overhead conveyor system which is designed for automated materials forwarding applications in industrial plants, distribution centers, service buildings, etc. A feature is the CM Telematic Route Selector Dispatch Head with a dial which can be set to automatically guide a carrier to any one of 70 stations in the system. The Telematic Route Selector Dispatch Head can be furnished with each carrier.

PNEUMAVALVE — Item 33

Connor Engineering Corporation has introduced a complete line of total constant volume high velocity valve attenuators. Features of the products include: foolproof—self-cleaning without perforations to clog with dust; less maintenance—no springs to adjust, no motors to wear, no linkage to loosen; sensitive—instant response to slightest change in control pressure; uniform temperature—positive air mixing without stratification, extra quiet, compact and rugged, constant air volume; and flexible-grilles or diffusers can be used for ceiling, wall or under-window mounting.

SQUARE D SWITCH — Item 34

Square D Company's line of Type AW oil-tight limit switches is now available with a 2-pole, double-throw snap switch. The new 2-pole switch can control up to four circuits. It mounts interchangeably with other Type AW limit switches, thereby simplifying installation. Square D 2-pole limit switches are offered with a wide selection of operators including push rods, roller plungers and roller arms in a variety of lengths and designs.



SPIRADOR — Item 35

A door of superior construction has been added to the Dusing and Hunt line of flush metal doors to introduce the unique, low cost "SPIRADOR". The door with a core of precision machine treated hardwood spirals has exceptional surface flatness, high resistance to denting and impact, plus exceptional acoustical sound deadening values.

DOORS — Item 36

Biggs-United, a Division of United Sheet Metal Company, Inc., has introduced a line of "Sure-Lock" safety locks for quick-opening doors for use with all production process equipment. The doors feature a floating gasket for smooth, easy, trouble-free door operation. The door opening mechanism cannot operate until the safety interlocked pin is actuated, insuring greater safety. Quality features include: anti-friction bearings; no metal warping, galling or scraping; long gasket life; field-adjustable for alignment; no castings; no unproven materials or construction.

URETHANE ROOFING — Item 37

Development of a new, easy-to-install rigid urethane roofing material, Hewfoam, which economically provides superior insulation and excellent weatherproofing for built-up roofs has been announced by H. E. Werner, Inc. Hewfoam provides a superior insulation that makes refrigeration, air-conditioning and heating economical, and because of its excellent resistance to moisture, Hewfoam provides the highest degree of weatherproofing to keep roofs and interiors practically maintenance free. It comes ready to install. It is lightweight and easy to handle. Saves on labor costs and helps get jobs done within contract time.

This feature describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

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31

The Oklahoma Test Road north of Oklahoma City will eventually be part of Interstate route 35

concrete wins on Oklahoma Test Road with maintenance cost 65% lower than asphalt!

5-year traffic test, ordered by the Oklahoma legislature, confirms again the findings of state highway departments and other official tests. Connecting two-mile sections of concrete and of asphalt, both the best of their type, were built in 1955 on Oklahoma's US 77. For five years beginning Jan. 1, 1956, exact records were kept of all *pavement* maintenance costs. Total for concrete: $557.82. For asphalt: $1,591.87. And not only did the asphalt cost nearly 3 times as much to maintain during the five years—it is already getting its first resurfacing at an additional cost of $43,753.

Substantial maintenance economy is one reason why concrete is the choice of so many states today. Engineers are designing concrete pavements to last 50 years and more. It's the one pavement that can be designed *mathematically* to meet specific wheel load requirements. It's the only pavement with beam strength and stability.

The Oklahoma Test Road proves again the long-term value of concrete pavements. The first cost isn't just a down payment. Concrete provides true economy for Interstate highways as well as for other heavy-duty roads.

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

Complete resurfacing after only five years adds another $43,753 to asphalt's upkeep!

Despite continued surface maintenance for five years, the asphalt pavement on the Oklahoma Test Road has deteriorated to the point where complete resurfacing is required. The asphalt sections are being overlaid with 1½ inches of surfacing to seal out moisture and provide a new wearing course. When comparison is made, as shown here, on the basis of *total upkeep* cost, concrete's advantage is dramatic.

CONCRETE

5-year surface maintenance	$557.82
total surface upkeep	$557.82

ASPHALT

5-year surface maintenance	$1,591.87
complete resurfacing	$43,753.00
total surface upkeep	$45,344.87